

FIG. 1

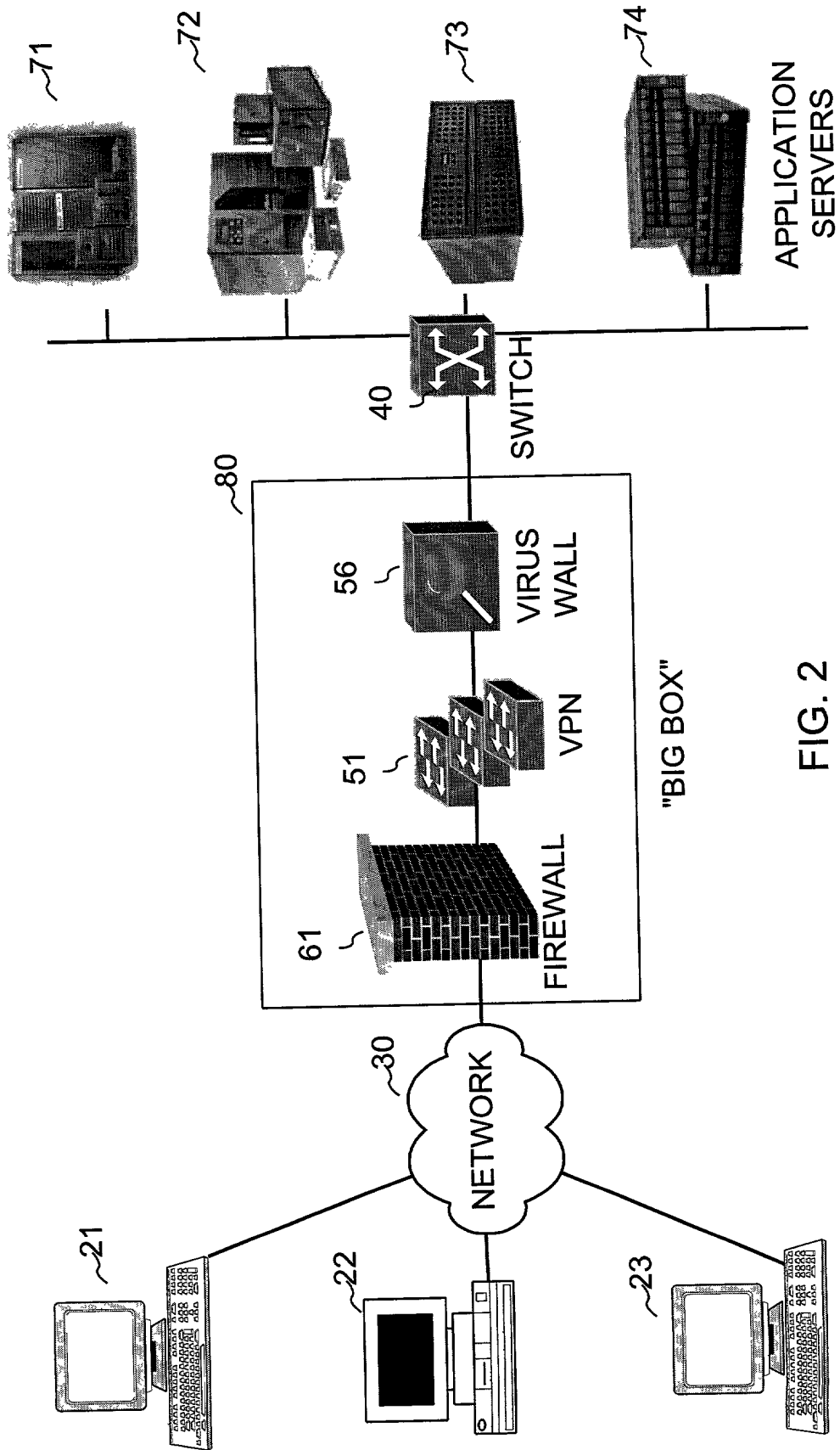


FIG. 2

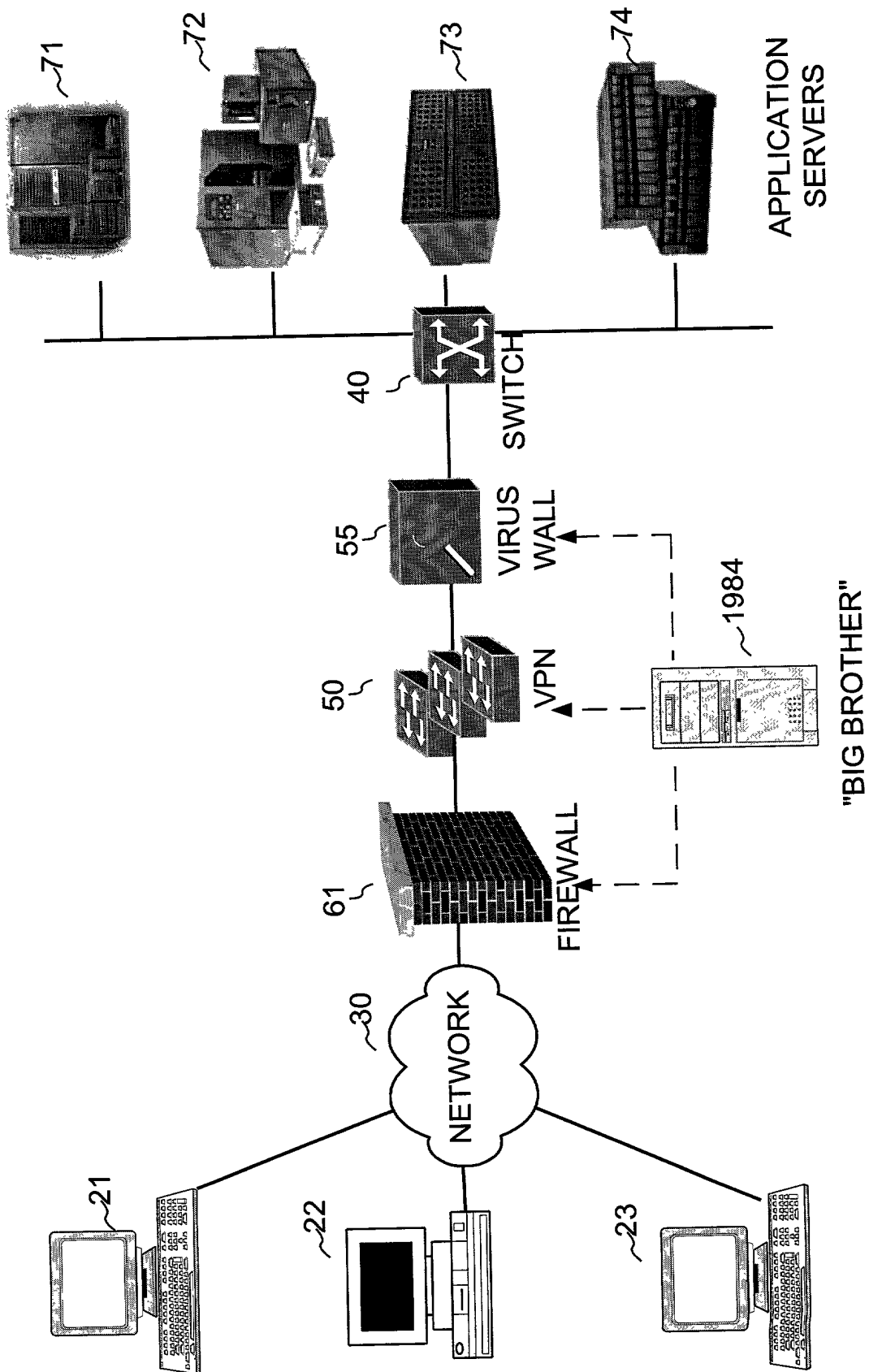


FIG. 3

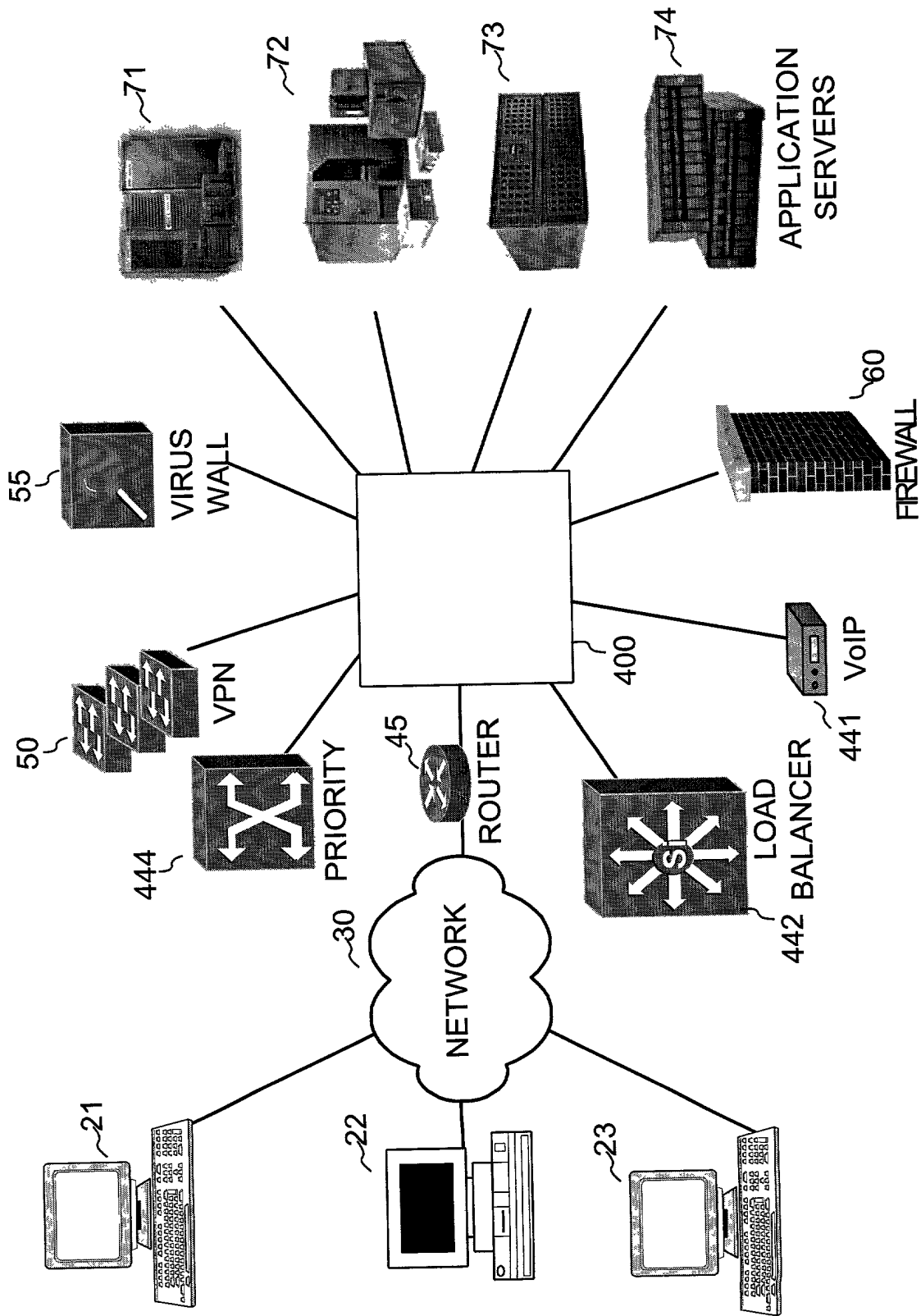


FIG. 4

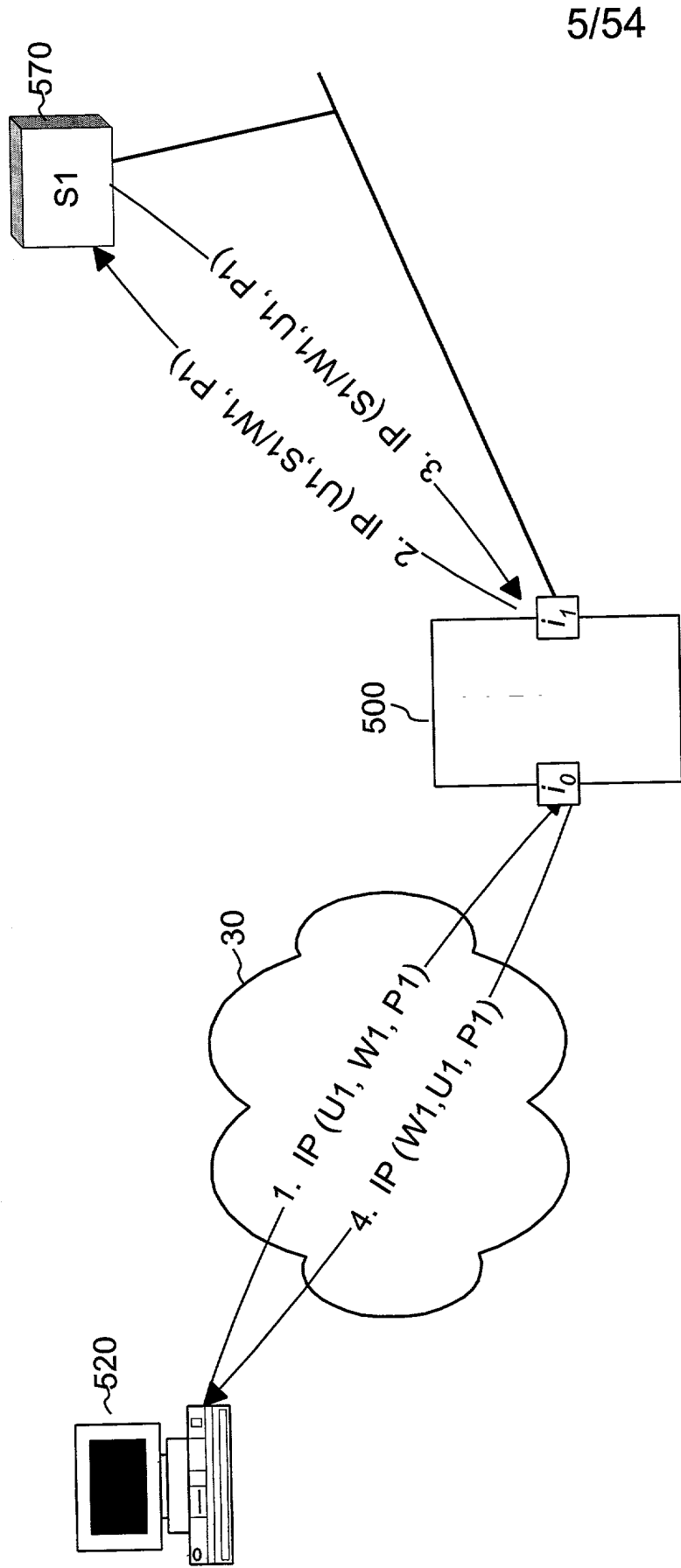


FIG. 5

STEP	FROM	TO	SOURCE IP	DESTINATION IP	SERVICE PORT
1	U1 (CLIENT)	PACKETING ENGINE	U1	W1	P1
2	PACKETING ENGINE	S1 (SERVER)	U1	S1 (IF NAT IS REQUIRED); W1 (IF S1 SUPPORTS LOOPBACK OR ALIAS)	P1
3	S1	PACKETING ENGINE	S1 (IF NAT IS REQUIRED); W1 (IF S1 SUPPORTS LOOPBACK OR ALIAS)	U1	P1
4	PACKETING ENGINE	U1	W1	U1	P1

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FIG. 5A

STEP	FROM	TO	SOURCE IP	DESTINATION IP	SERVICE PORT
1	U1	PACKETING ENGINE	U1	W1	P1
2	PACKETING ENGINE	S1	U1	W1	P1
3	S1	PACKETING ENGINE	W1	U1	P1
4	PACKETING ENGINE	U1	W1	U1	P1

FIG. 5C

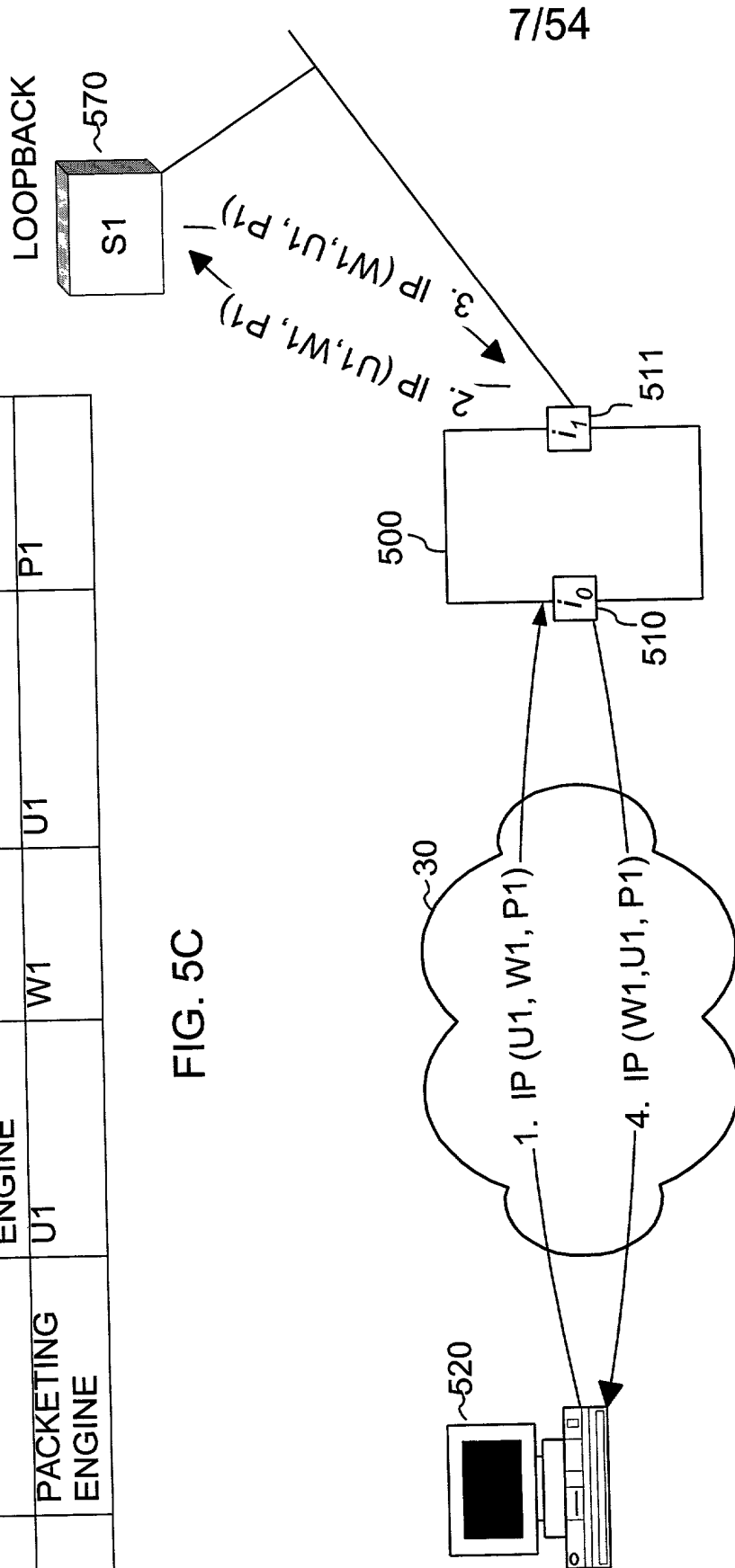
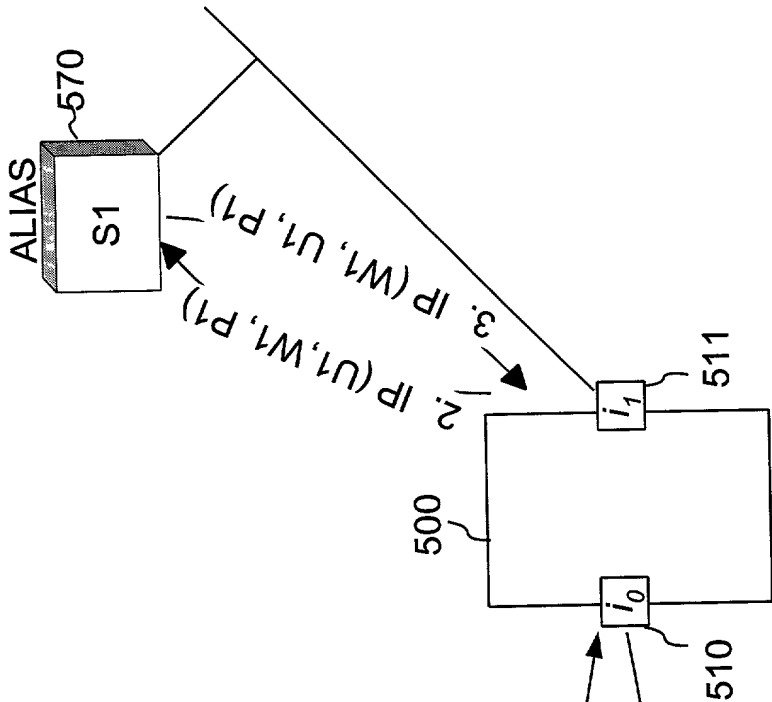


FIG. 5B

TABLE MAINTAINED BY PACKETING ENGINE									
RECEIVE PACKET INBOUND TO PACKETING ENGINE					SEND IT OUTBOUND FROM PACKETING ENGINE				
RECEIVED ON INTERFACE	SOURCE ADDRESS		DEST. IP ADDRESS	SERVICE PORT	SEND FROM INTERFACE	DEST. SYSTEM TYPE	SEND PACKET TO		
	MAC	IP					MAC	IP	
$I_0$			$W_1$	$P_1$	$I_1$	LOOPBACK	$S1_M$	$W_1$	
$I_1$	$S1_M$	$W_1$		$P_1$	$I_0$	ROUTER			DEFAULT ROUTE

FIG. 5D

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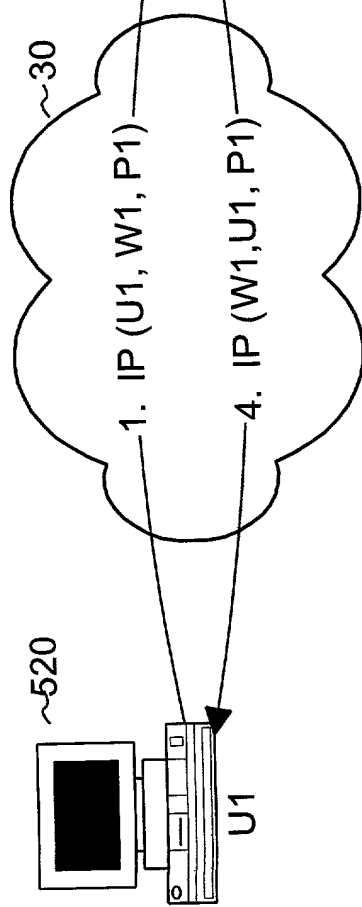


FIG. 5E



STEP	FROM	TO	SOURCE IP	DESTINATION IP	SERVICE PORT
1	U1	PACKETING ENGINE	U1	W1	P1
2	PACKETING ENGINE	S1	U1	W1	P1
3	S1	PACKETING ENGINE	W1	U1	P1
4	PACKETING ENGINE	U1	W1	U1	P1

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FIG. 5F

TABLE MAINTAINED BY PACKETING ENGINE								
RECEIVE PACKET INBOUND TO PACKETING ENGINE				SEND IT OUTBOUND FROM PACKETING ENGINE				
RCX ON INT.	SOURCE ADDRESS		DESTINATION IP ADDRESS	SERVICE PORT	SEND VIA INT.	DEST. SYSTEM TYPE	SEND PACKET TO	
	MAC	IP					MAC	IP
I <sub>0</sub>			W <sub>1</sub>	P <sub>1</sub>	I <sub>1</sub>	ALIAS	S <sub>1M</sub>	W <sub>1</sub>
I <sub>1</sub>	S <sub>1M</sub>	W <sub>1</sub>		P <sub>1</sub>	I <sub>0</sub>	ROUTER		DEFAULT ROUTE

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FIG. 5G

STEP	FROM	TO	SOURCE IP	DESTINATION IP	SERVICE PORT
1	U1	PACKETING ENGINE	U1	W1	P1
2	PACKETING ENGINE	S1	U1	S1	P1
3	S1	PACKETING ENGINE	S1	U1	P1
4	PACKETING ENGINE	U1	W1	U1	P1

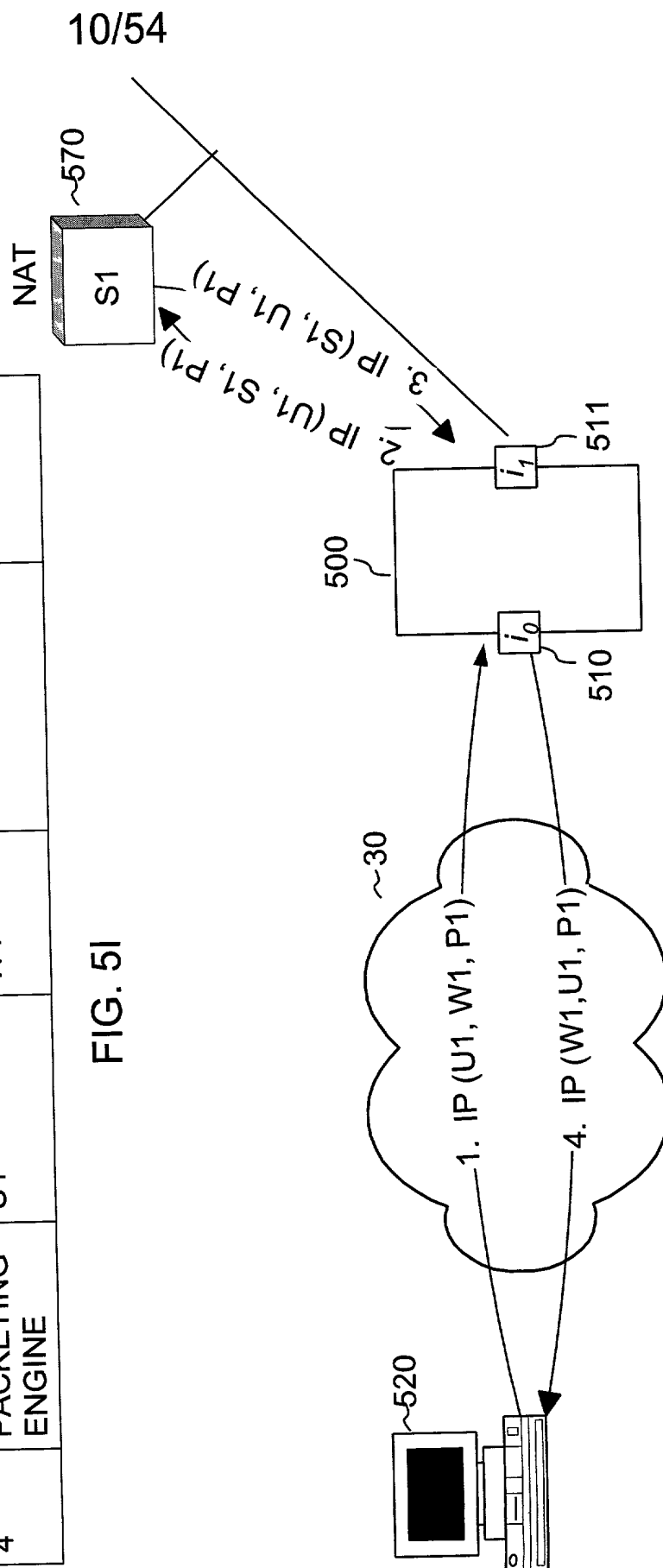


TABLE MAINTAINED BY PACKETING ENGINE					
RECEIVE PACKET INBOUND TO PACKETING ENGINE			SEND IT OUTBOUND FROM PACKETING ENGINE		
RCX ON INT.	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SERVICE PORT	SEND VIA INT.	DEST. SYSTEM TYPE
$I_0$	$S_1$	$W_1$	$P_1$	$I_1$	NAT REQUIRED
$I_1$			$P_1$	$I_0$ (AFTER REVERSE NAT SOURCE IP TO $W_1$ )	ROUTER
					DEFAULT ROUTE

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FIG. 5J

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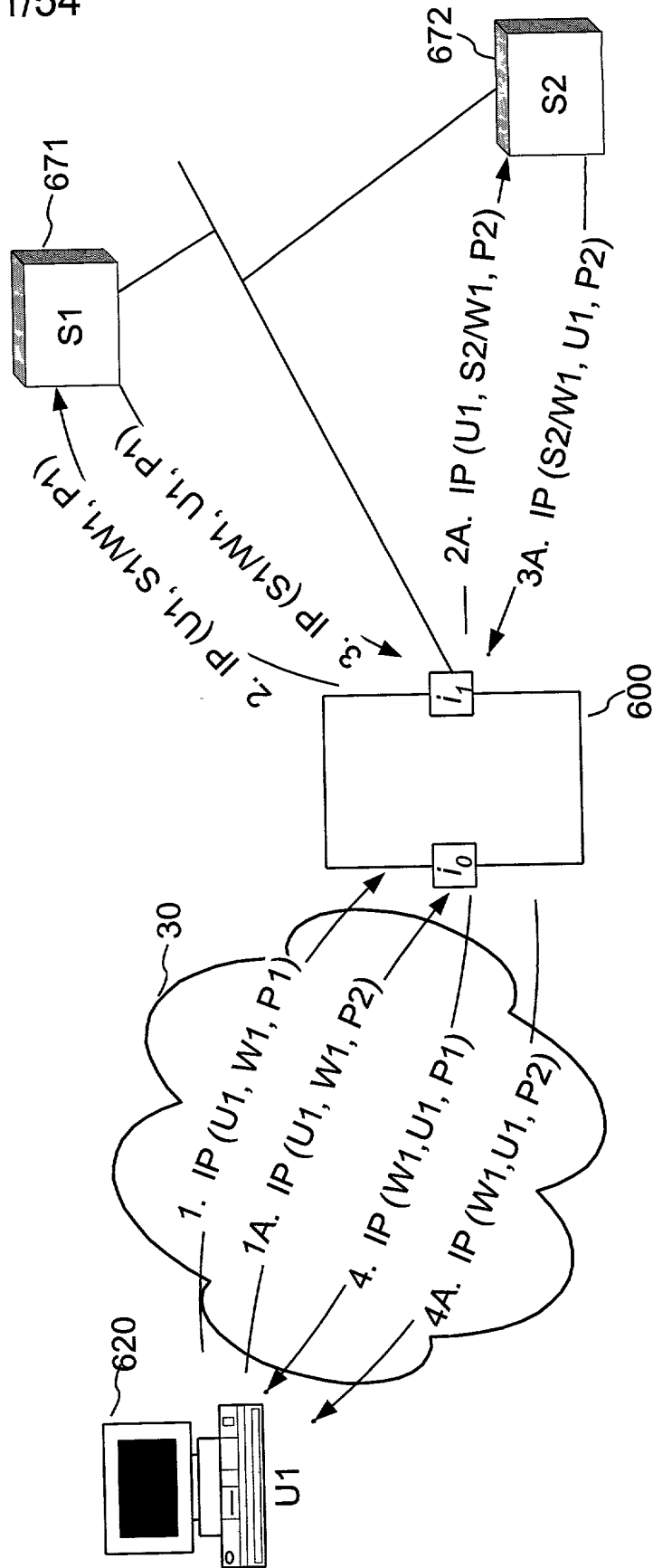


FIG. 6

STEP	FROM	TO	SOURCE IP	DESTINATION IP	PORT
PORT P1					
1	U1 (CLIENT)	PACKETING ENGINE	U1	W1	P1
2	PACKETING ENGINE	S1 (SERVER)	U1	S1 (IF NAT IS REQUIRED); W1 (IF S1 SUPPORTS LOOPBACK OR ALIAS)	P1
3	S1	PACKETING ENGINE	S1 (IF NAT IS REQUIRED); W1 (IF S1 SUPPORTS LOOPBACK OR ALIAS)	U1	P1
4	PACKETING ENGINE	U1	W1	U1	P1
PORT P2					
1A	U1 (CLIENT)	PACKETING ENGINE	U1	W1	P2
2A	PACKETING ENGINE	S2 (SERVER)	U1	S2 (IF NAT IS REQUIRED); W1 (IF S2 SUPPORTS LOOPBACK OR ALIAS)	P2
3A	S1	PACKETING ENGINE	S2 (IF NAT IS REQUIRED); W1 (IF S1 SUPPORTS LOOPBACK OR ALIAS)	U1	P2
4A	PACKETING ENGINE	U1	W1	U1	P2

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FIG. 6A

TABLE MAINTAINED BY PACKETING ENGINE									
RECEIVE PACKET INBOUND TO PACKETING ENGINE					SEND IT OUTBOUND FROM PACKETING ENGINE				
RCX ON INT.	SOURCE IP ADDRESS		DEST. IP ADDRESS	SERVICE PORT	SEND VIA INT.	DEST. SYSTEM TYPE	SEND PACKET TO		
	MAC	IP					MAC	IP	
I <sub>0</sub>			W1	P1	I <sub>1</sub>	LOOPBACK	S1 <sub>M</sub>	W1	
						ALIAS	S1 <sub>M</sub>	W1	
						NAT		S1	
I <sub>1</sub>	S1 <sub>M</sub>	W1		P1	I <sub>0</sub> (AFTER REVERSE NAT SOURCE IP TO W1)	ROUTER			DEFAULT ROUTE
	S1 <sub>M</sub>	S1							
I <sub>0</sub>			W1	P2	I <sub>1</sub>	LOOPBACK	S2 <sub>M</sub>	W1	
						ALIAS	S2 <sub>M</sub>	W1	
						NAT		S2	
I <sub>1</sub>	S2 <sub>M</sub>	W1		P2	I <sub>0</sub> (AFTER REVERSE NAT SOURCE IP TO W1)	ROUTER			DEFAULT ROUTE
	S2 <sub>M</sub>	S2							

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FIG. 6B

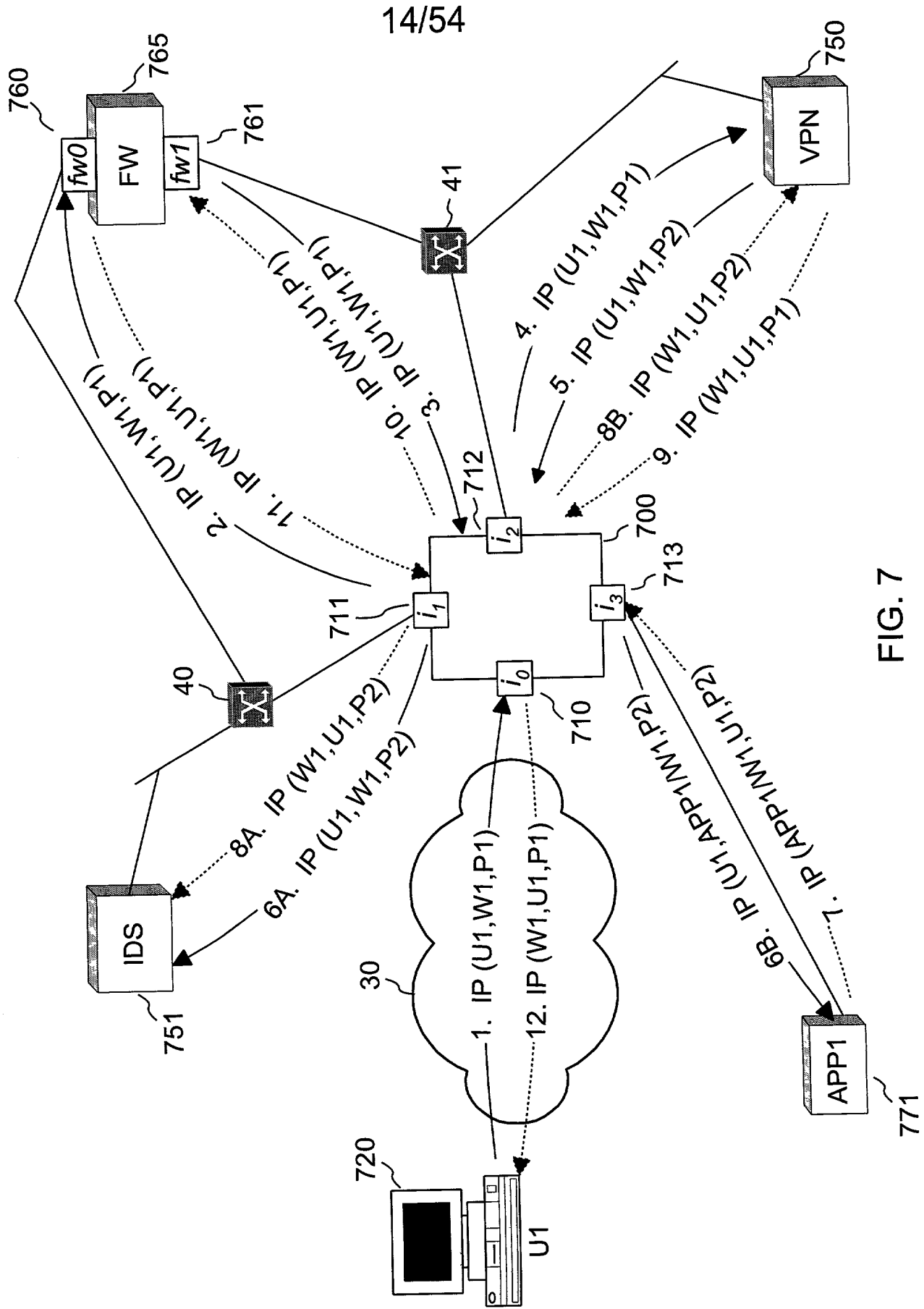


FIG. 7

STEP	FROM	TO	SOURCE IP	DESTINATION IP	PORT
1	U1 (CLIENT)	PACKETING ENGINE	U1	W1	P1
2	PACKETING ENGINE	FW (INTERFACE FW0)	U1	W1	P1
3	FW (INTERFACE FW1)	PACKETING ENGINE	U1	W1	P1
4	PACKETING ENGINE	VPN	U1	W1	P1
5	VPN	PACKETING ENGINE	U1	W1	P2
6A	PACKETING ENGINE	IDS	U1	W1	P2
6B	PACKETING ENGINE	APP1	U1	APP1 (IF NAT REQUIRED); W1 (IF LOOPBACK OR ALIAS SUPPORTED BY APP1)	P2
7	APP1	PACKETING ENGINE	APP1 (IF NAT REQUIRED); W1 (IF LOOPBACK OR ALIAS SUPPORTED BY APP1)	U1	P2
8A	PACKETING ENGINE	IDS	W1	U1	P2
8B	PACKETING ENGINE	VPN	W1	U1	P2
9	VPN	PACKETING ENGINE	W1	U1	P1
10	PACKETING ENGINE	FW (INTERFACE FW1)	W1	U1	P1
11	FW (INTERFACE FW0)	PACKETING ENGINE	W1	U1	P1
12	PACKETING ENGINE	U1	W1	U1	P1

FIG. 7A

TABLE MAINTAINED BY PACKETING ENGINE									
RECEIVE PACKET INBOUND TO PACKETING ENGINE					SEND IT OUTBOUND FROM PACKETING ENGINE				
RCX ON INT.	SOURCE ADDRESS		DEST. IP ADDRESS	SERVICE PORT	SEND VIA INT.	DEST. SYSTEM TYPE	SEND PACKET TO		
	MAC	IP					MAC	IP	
I <sub>0</sub>			W1	P1	I <sub>1</sub>	TRANSPARENT	FW0 <sub>M</sub>	W1	
I <sub>2</sub>	FW1 <sub>M</sub>		W1	P1	I <sub>2</sub>	TRANSPARENT	VPN <sub>M</sub>	W1	
I <sub>2</sub>	VPN <sub>M</sub>		W1	P2	I <sub>1</sub>	TRANSPARENT	IDS <sub>M</sub>	W1	
					I <sub>3</sub>	LOOPBACK	APP1 <sub>M</sub>	W1	
						ALIAS	APP1 <sub>M</sub>	W1	
						NAT		APP1	
I <sub>1</sub>	IDS <sub>M</sub>			P2	I <sub>3</sub>	LOOPBACK	APP1 <sub>M</sub>	W1	
						ALIAS	APP1 <sub>M</sub>	W1	
						NAT		APP1	
I <sub>3</sub>	APP1 <sub>M</sub>	APP1 OR W1		P2	I <sub>1</sub>	TRANSPARENT	IDS <sub>M</sub>		
					I <sub>2</sub>	TRANSPARENT	VPN <sub>M</sub>		
I <sub>2</sub>	VPN <sub>M</sub>	W1		P1	I <sub>2</sub>	TRANSPARENT	FW1 <sub>M</sub>		
I <sub>1</sub>	FW0 <sub>M</sub>	W1		P1	I <sub>0</sub>	ROUTER			DEFAULT ROUTE

FIG. 7B

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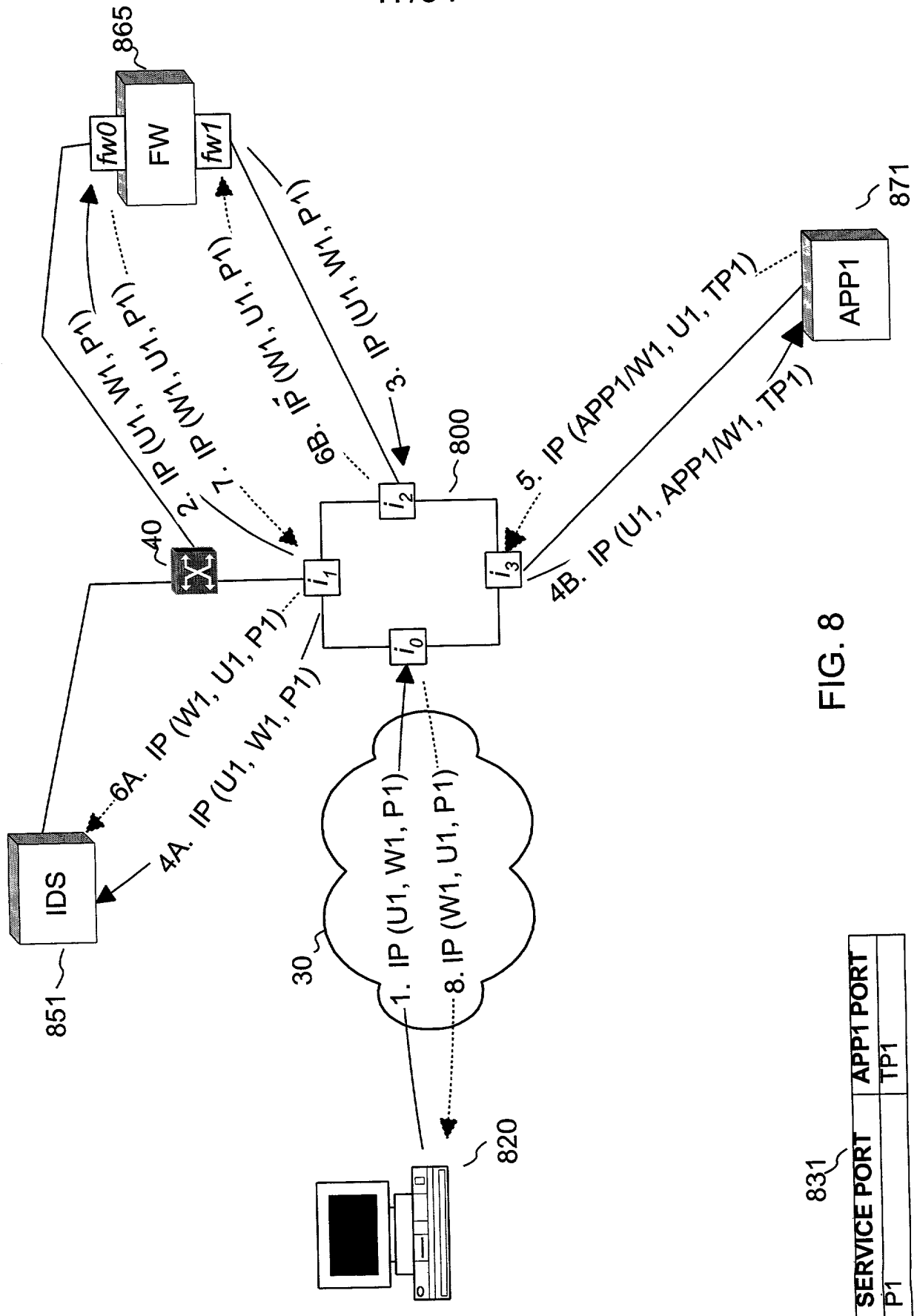


FIG. 8

FIG. 8A

STEP	FROM	TO	SOURCE IP	DESTINATION IP	SERVICE PORT
1	U1 (CLIENT)	PACKETING ENGINE	U1	W1	P1
2	PACKETING ENGINE	FW (INTERFACE FW0)	U1	W1	P1
3	FW (INTERFACE FW1)	PACKETING ENGINE	U1	W1	P1
4A	PACKETING ENGINE	IDS	U1	W1	P1
4B	PACKETING ENGINE	APP1	U1	APP1 (IF NAT REQUIRED); W1 (IF LOOPBACK OR ALIAS SUPPORTED BY APP1)	TP1
5	APP1	PACKETING ENGINE	APP1 (IF NAT REQUIRED); W1 (IF LOOPBACK OR ALIAS SUPPORTED BY APP1)	U1	TP1
6A	PACKETING ENGINE	IDS	W1	U1	P1
6B	PACKETING ENGINE	FW (INTERFACE FW1)	W1	U1	P1
7	FW (INTERFACE FW0)	PACKETING ENGINE	W1	U1	P1
8	PACKETING ENGINE	U1	W1	U1	P1

FIG. 8B

TABLE MAINTAINED BY PACKETING ENGINE									
RECEIVE PACKET INBOUND TO PACKETING ENGINE					SEND IT OUTBOUND FROM PACKETING ENGINE				
RCX ON INT.	SOURCE ADDRESS		DEST. IP ADDRESS	SERVICE PORT	SEND VIA INT.	DEST. SYSTEM TYPE	SEND PACKET TO		
	MAC	IP					MAC	IP	PORT
I <sub>0</sub>			W1	P1	I <sub>1</sub>	TRANSPARENT	FW0 <sub>M</sub>	W1	P1
I <sub>2</sub>	FW <sub>M</sub>		W1	P1	I <sub>1</sub>	TRANSPARENT	IDS <sub>M</sub>	W1	P1
					I <sub>3</sub>	LOOPBACK	APP1 <sub>M</sub>	W1	TP1
						ALIAS	APP1 <sub>M</sub>	W1	TP1
						NAT		APP1	TP1
I <sub>1</sub>	IDS <sub>M</sub>			P1	I <sub>3</sub>	LOOPBACK	APP1 <sub>M</sub>	W1	TP1
						ALIAS	APP1 <sub>M</sub>	W1	TP1
						NAT		APP1	TP1
I <sub>3</sub>	APP1 <sub>M</sub>	APP1 OR W1		TP1	I <sub>1</sub>	TRANSPARENT	IDS <sub>M</sub>		P1
					I <sub>2</sub>	TRANSPARENT	FW1 <sub>M</sub>		P1
I <sub>1</sub>	FW <sub>M</sub>	W1		P1	I <sub>0</sub>	ROUTER		DEFAULT ROUTE	P1

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FIG. 8C

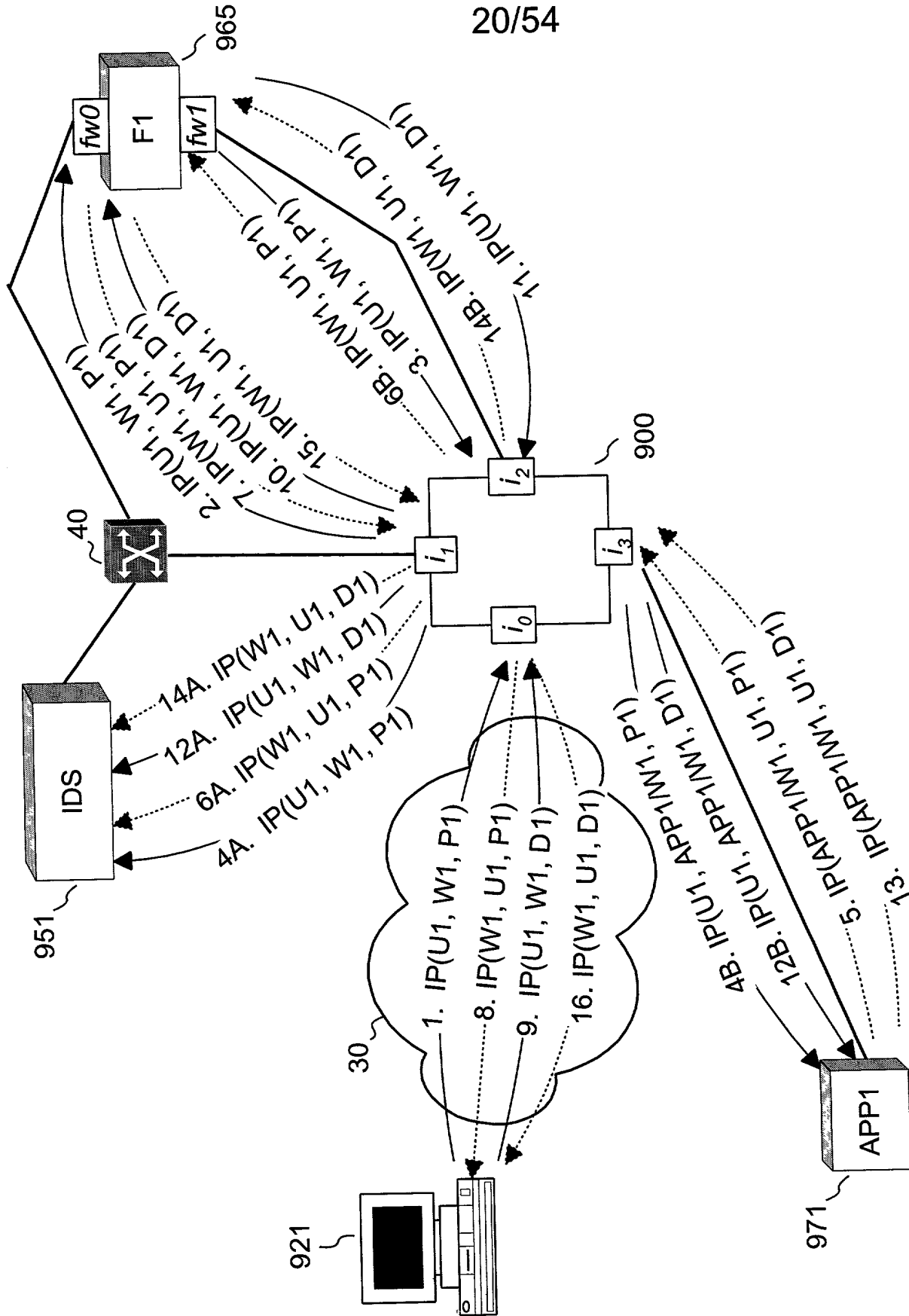


FIG. 9

STEP	FROM	TO	SOURCE IP	DESTINATION IP	PORT
1	U1 (CLIENT)	PACKETING ENGINE	U1	W1	P1
2	PACKETING ENGINE	FIREWALL F1 (INT. FW0)	U1	W1	P1
3	FIREWALL F1 (INT. FW1)	PACKETING ENGINE	U1	W1	P1
4A	PACKETING ENGINE	IDS	U1	W1	P1
4B	PACKETING ENGINE	APP1	U1	APP1 (IF NAT); W1 (IF LOOPBACK OR ALIAS)	P1
5	APP1	PACKETING ENGINE	APP1 (IF NAT); W1 (IF LOOPBACK OR ALIAS)	U1	P1
6A	PACKETING ENGINE	IDS	W1	U1	P1
6B	PACKETING ENGINE	FIREWALL F1 (INT. FW1)	W1	U1	P1
7	FIREWALL F1 (INT. FW0)	PACKETING ENGINE	W1	U1	P1
8	PACKETING ENGINE	U1	W1	U1	P1
9	U1 (CLIENT)	PACKETING ENGINE	U1	W1	D1
10	PACKETING ENGINE	FIREWALL F1 (INT. FW0)	U1	W1	D1
11	FIREWALL F1 (INT. FW1)	PACKETING ENGINE	U1	W1	D1
12A	PACKETING ENGINE	IDS	U1	W1	D1
12B	PACKETING ENGINE	APP1	U1	APP1 (IF NAT); W1 (IF LOOPBACK OR ALIAS)	D1
13	APP1	PACKETING ENGINE	APP1 (IF NAT); W1 (IF LOOPBACK OR ALIAS)	U1	D1
14A	PACKETING ENGINE	IDS	W1	U1	D1
14B	PACKETING ENGINE	FIREWALL F1 (INT. FW1)	W1	U1	D1
15	FIREWALL F1 (INT. FW0)	PACKETING ENGINE	W1	U1	D1
16	PACKETING ENGINE	U1	W1	U1	D1

FIG. 9A

TABLES MAINTAINED BY PACKETING ENGINE									
RECEIVE PACKET INBOUND TO PACKETING ENGINE				SEND IT OUTBOUND FROM PACKETING ENGINE					
RCX ON INT.	SOURCE ADDRESS		DEST. IP ADDRESS	SERVICE PORT	SEND VIA INT.	DEST. SYSTEM TYPE	SEND PACKET TO		
	MAC	IP					MAC	IP	
$I_0$			W1	P1 OR PORT IN RANGE OF 1025→1125	$I_1$	TRANSPARENT	FW0 <sub>M</sub>	W1	
$I_2$	FW1 <sub>M</sub>		W1	P1 OR PORT IN RANGE OF 1025→1125	$I_1$	TRANSPARENT	IDS <sub>M</sub>	W1	
					$I_3$	LOOPBACK	APP1 <sub>M</sub>	W1	
						ALIAS	APP1 <sub>M</sub>	W1	
						NAT		APP1	
$I_1$	IDS <sub>M</sub>			P1 OR PORT IN RANGE OF 1025→1125	$I_3$	LOOPBACK	APP1	W1	
						ALIAS	APP1 <sub>M</sub>	W1	
						NAT		APP1	
$I_3$	APP1 <sub>M</sub>	APP1 OR W1		P1 OR PORT IN RANGE OF 1025→1125	$I_1$	TRANSPARENT	IDS <sub>M</sub>		
					$I_2$	TRANSPARENT	FW1 <sub>M</sub>		
$I_1$	FW2 <sub>M</sub>	W1		P1 OR PORT IN RANGE OF 1025→1125	$I_0$	ROUTER			DEFAULT ROUTE

FIG. 9B

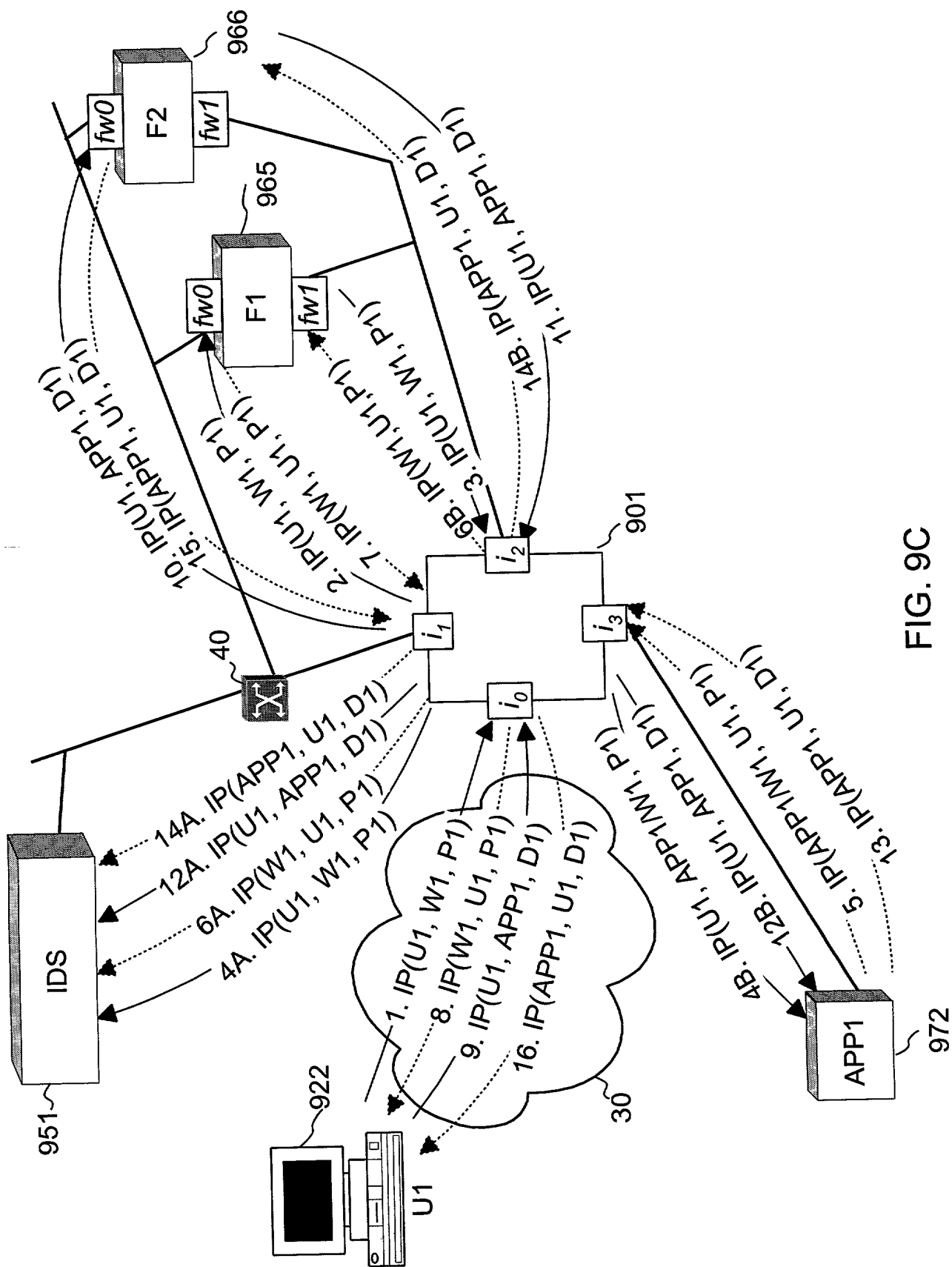


FIG. 9C

STEP	FROM	TO	SOURCE IP	DESTINATION IP	PORT
1	U1 (CLIENT)	PACKETING ENGINE	U1	W1	P1
2	PACKETING ENGINE	F1 (INT. FW0)	U1	W1	P1
3	F1 (INT. FW1)	PACKETING ENGINE	U1	W1	P1
4A	PACKETING ENGINE	IDS	U1	W1	P1
4B	PACKETING ENGINE	APP1	U1	APP1 (IF NAT REQUIRED); W1 (IF LOOPBACK OR ALIAS SUPPORTED BY APP1)	P1
5	APP1	PACKETING ENGINE	APP1 (IF NAT REQUIRED); W1 (IF LOOPBACK OR ALIAS SUPPORTED BY APP1)	U1	P1
6A	PACKETING ENGINE	IDS	W1	U1	P1
6B	PACKETING ENGINE	F1 (INT. FW1)	W1	U1	P1
7	F1 (INT. FW0)	PACKETING ENGINE	W1	U1	P1
8	PACKETING ENGINE	U1	W1	U1	P1
9	U1 (CLIENT)	PACKETING ENGINE	U1	APP1	D1
10	PACKETING ENGINE	F2 (INT. FW0)	U1	APP1	D1
11	F2 (INT. FW1)	PACKETING ENGINE	U1	APP1	D1
12A	PACKETING ENGINE	IDS	U1	APP1	D1
12B	PACKETING ENGINE	APP1	U1	APP1	D1
13	APP1	PACKETING ENGINE	APP1	U1	D1
14A	PACKETING ENGINE	IDS	APP1	U1	D1
14B	PACKETING ENGINE	F2 (INT. FW1)	APP1	U1	D1
15	F2 (INT. FW0)	PACKETING ENGINE	APP1	U1	D1
16	PACKETING ENGINE	U1	APP1	U1	D1

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FIG. 9D



TABLES MAINTAINED BY PACKETING ENGINE									
RECEIVE PACKET INBOUND TO PACKETING ENGINE					SEND IT OUTBOUND FROM PACKETING ENGINE				
RCX ON INT.	SOURCE ADDRESS		DEST. IP ADDRESS	SERVICE PORT	SEND VIA INT.	DEST. SYSTEM TYPE	SEND PACKET TO		
	MAC	IP					MAC	IP	
I <sub>0</sub>			W1	P1	I <sub>1</sub>	TRANSPARENT	F1(FW0) <sub>M</sub>	W1	
I <sub>2</sub>	F1(FW1) <sub>M</sub>		W1	P1	I <sub>1</sub>	TRANSPARENT	IDS <sub>M</sub>	W1	
					I <sub>3</sub>	LOOPBACK	APP1 <sub>M</sub>	W1	
						ALIAS	APP1 <sub>M</sub>	W1	
						NAT		APP1	
I <sub>1</sub>	IDS <sub>M</sub>			P1	I <sub>3</sub>	LOOPBACK	APP1 <sub>M</sub>	W1	
						ALIAS	APP1 <sub>M</sub>	W1	
						NAT		APP1	
I <sub>3</sub>	APP1 <sub>M</sub>	APP1 OR W1		P1	I <sub>1</sub>	TRANSPARENT	IDS <sub>M</sub>		
					I <sub>2</sub>	TRANSPARENT	F1(FW1) <sub>M</sub>		
I <sub>1</sub>	F1(FW0) <sub>M</sub>	W1		P1	I <sub>0</sub>	ROUTER		DEFAULT ROUTE	
I <sub>0</sub>			APP1	PORT>1024	I <sub>1</sub>	TRANSPARENT	F2(FW0) <sub>M</sub>	APP1	
I <sub>2</sub>	F2(FW1) <sub>M</sub>		APP1	PORT>1024	I <sub>1</sub>	TRANSPARENT	IDS <sub>M</sub>	APP1	
					I <sub>3</sub>	SERVER IP ADDRESS	APP1 <sub>M</sub>	APP1	
I <sub>1</sub>	IDS <sub>M</sub>			PORT>1024	I <sub>3</sub>	SERVER IP ADDRESS	APP1 <sub>M</sub>	APP1	
I <sub>3</sub>	APP1 <sub>M</sub>	APP1		PORT>1024	I <sub>1</sub>	TRANSPARENT	IDS <sub>M</sub>		
					I <sub>2</sub>	TRANSPARENT	F2(FW1) <sub>M</sub>		
I <sub>1</sub>	F2(FW0) <sub>M</sub>	APP1		PORT>1024	I <sub>0</sub>	ROUTER		DEFAULT ROUTE	

FIG. 9E

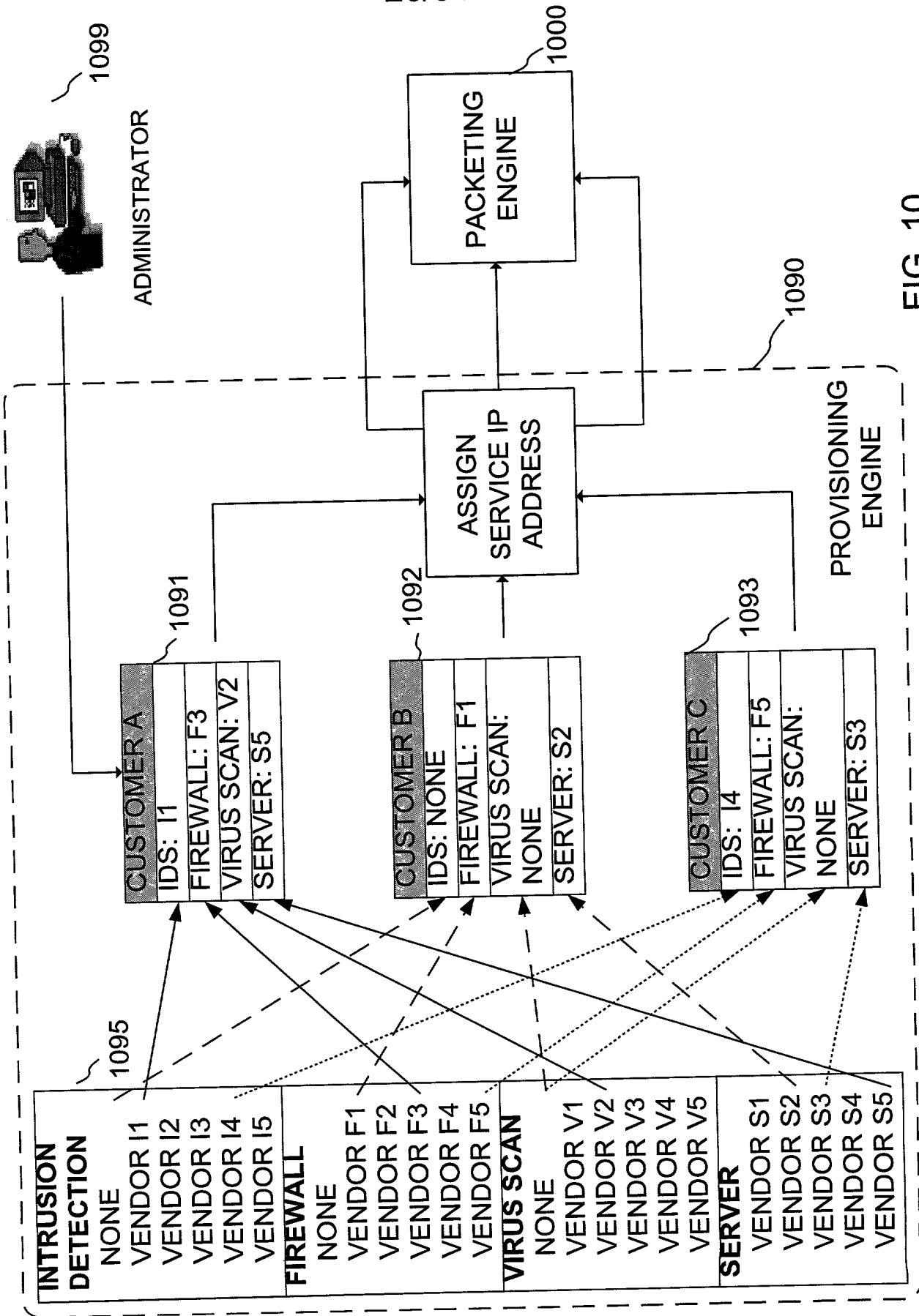
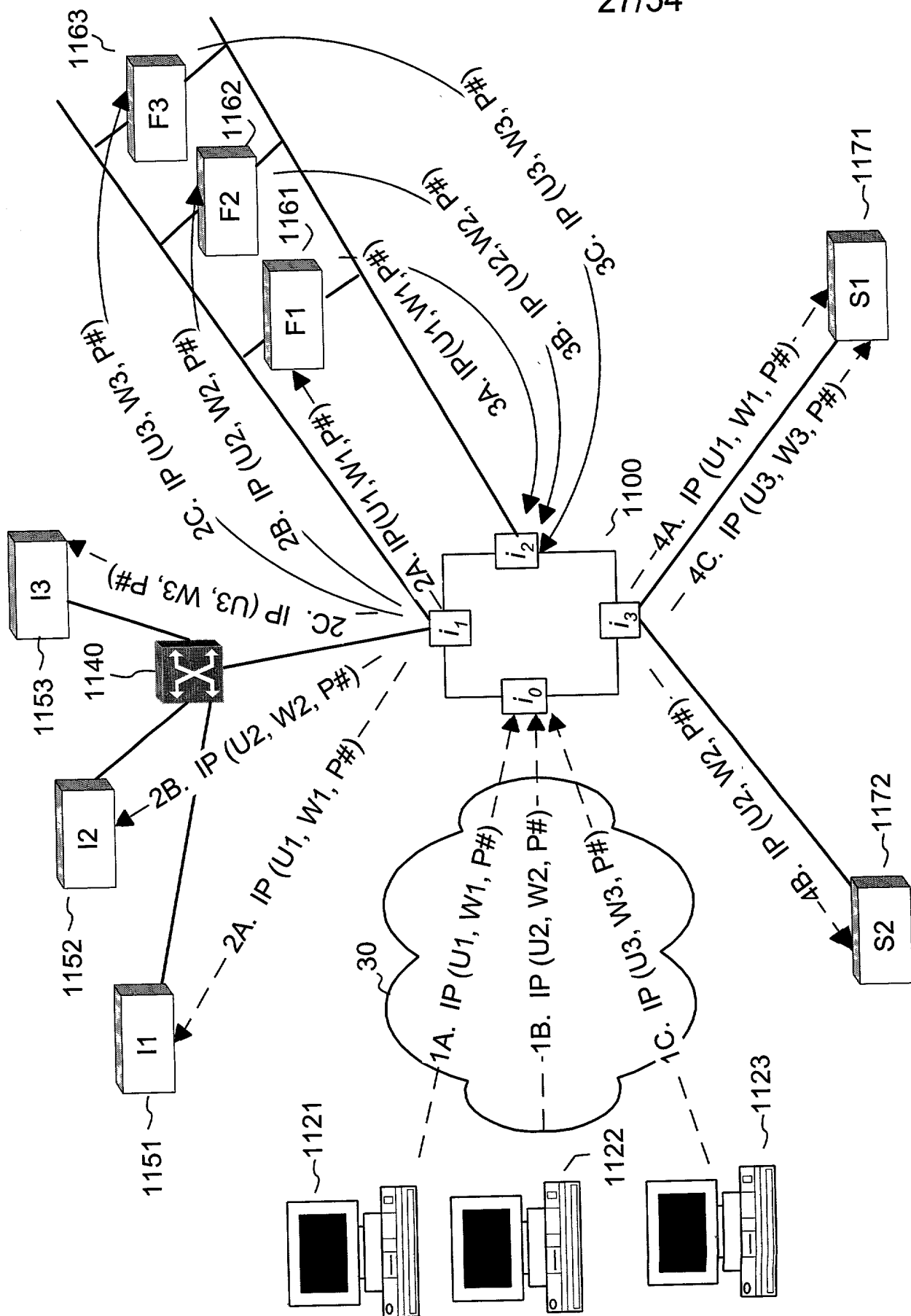
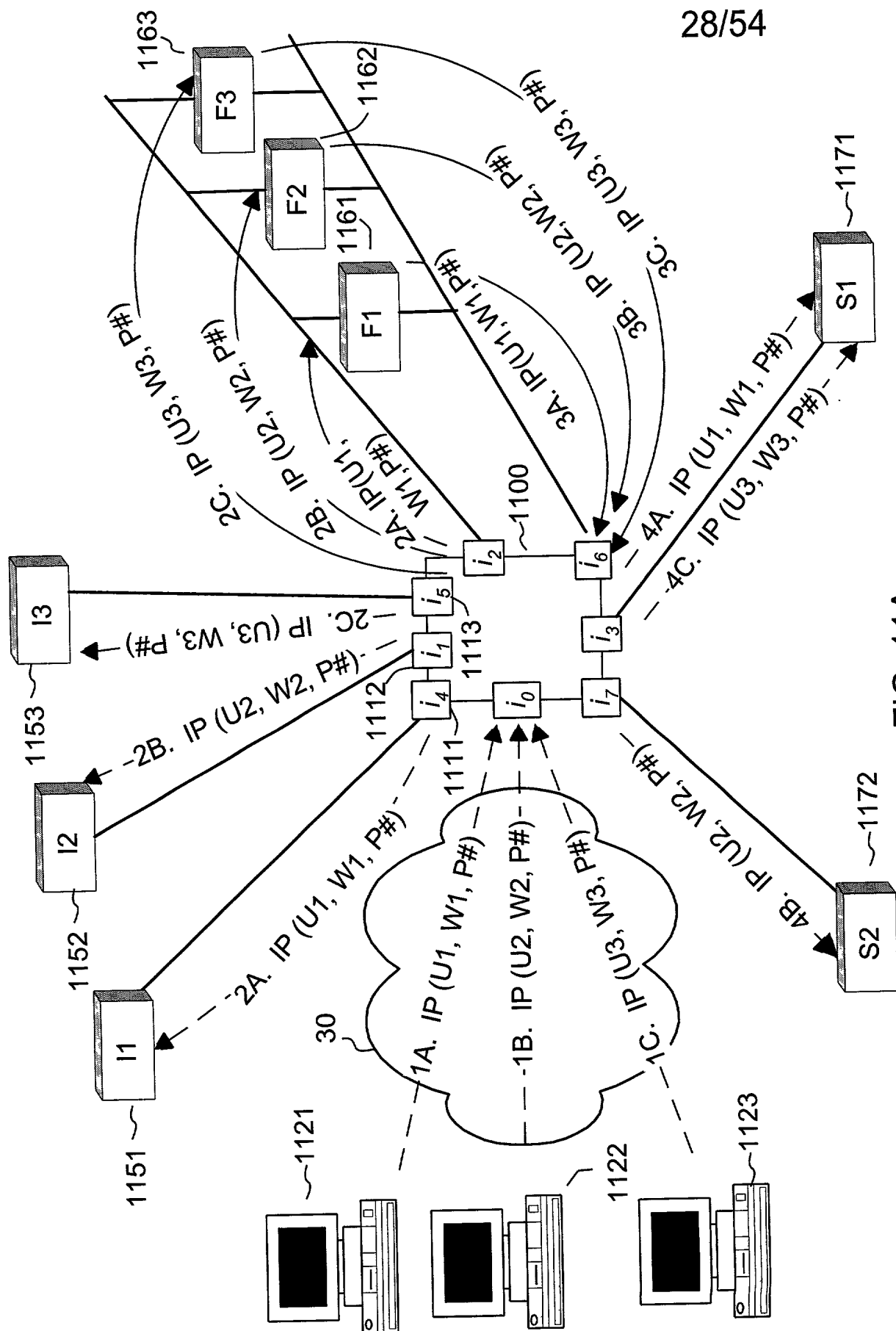
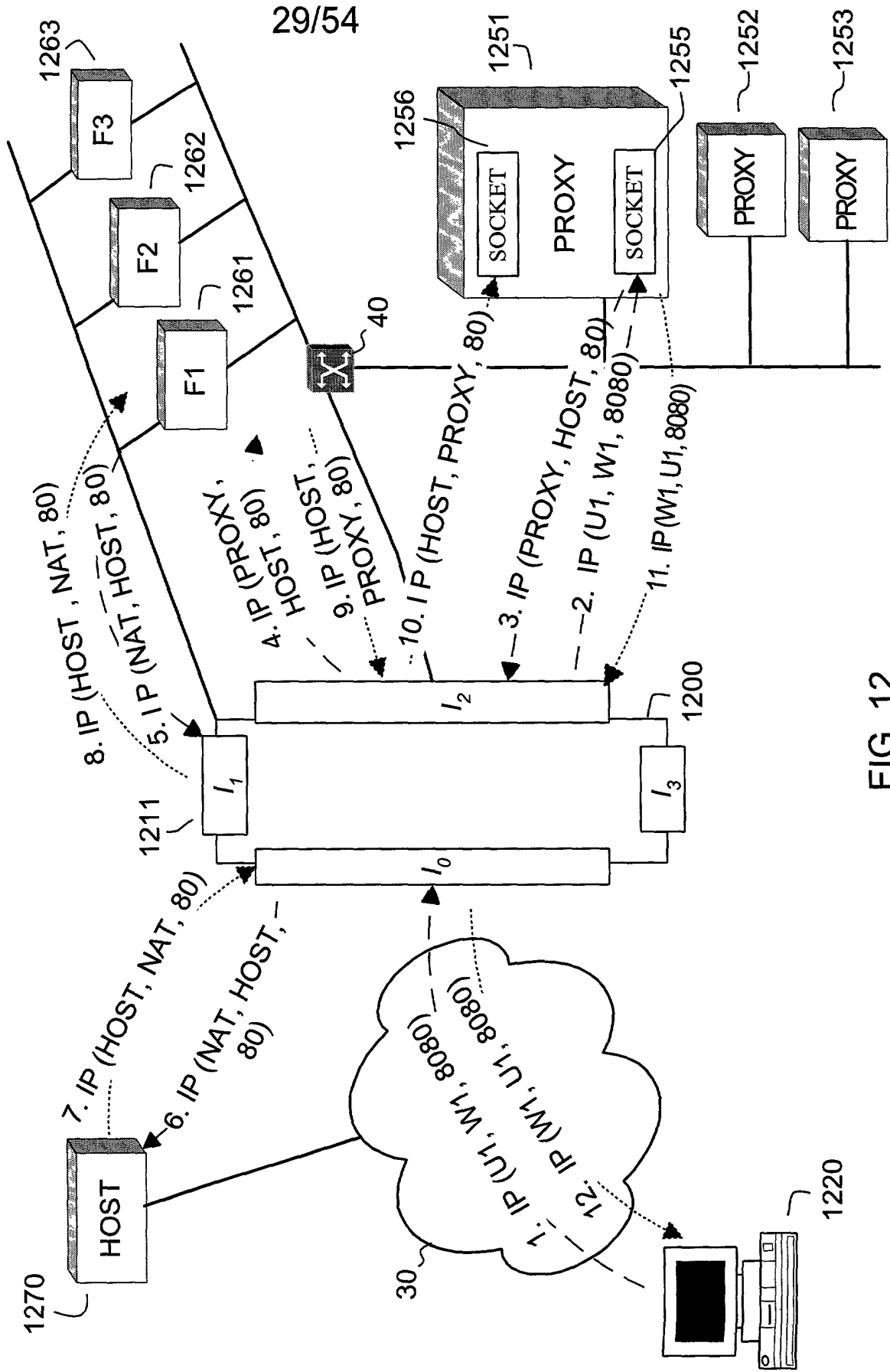


FIG. 10







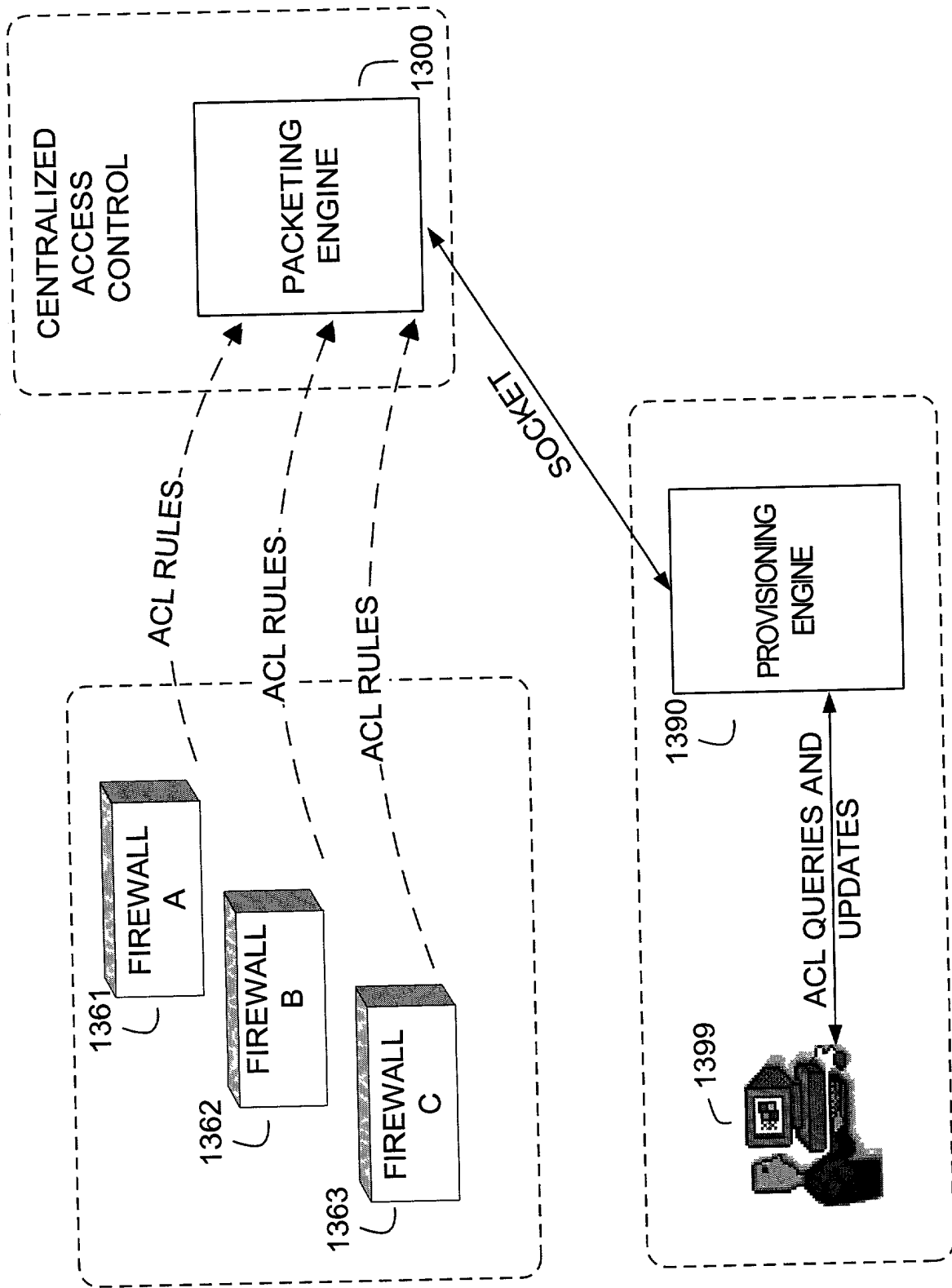


FIG. 13

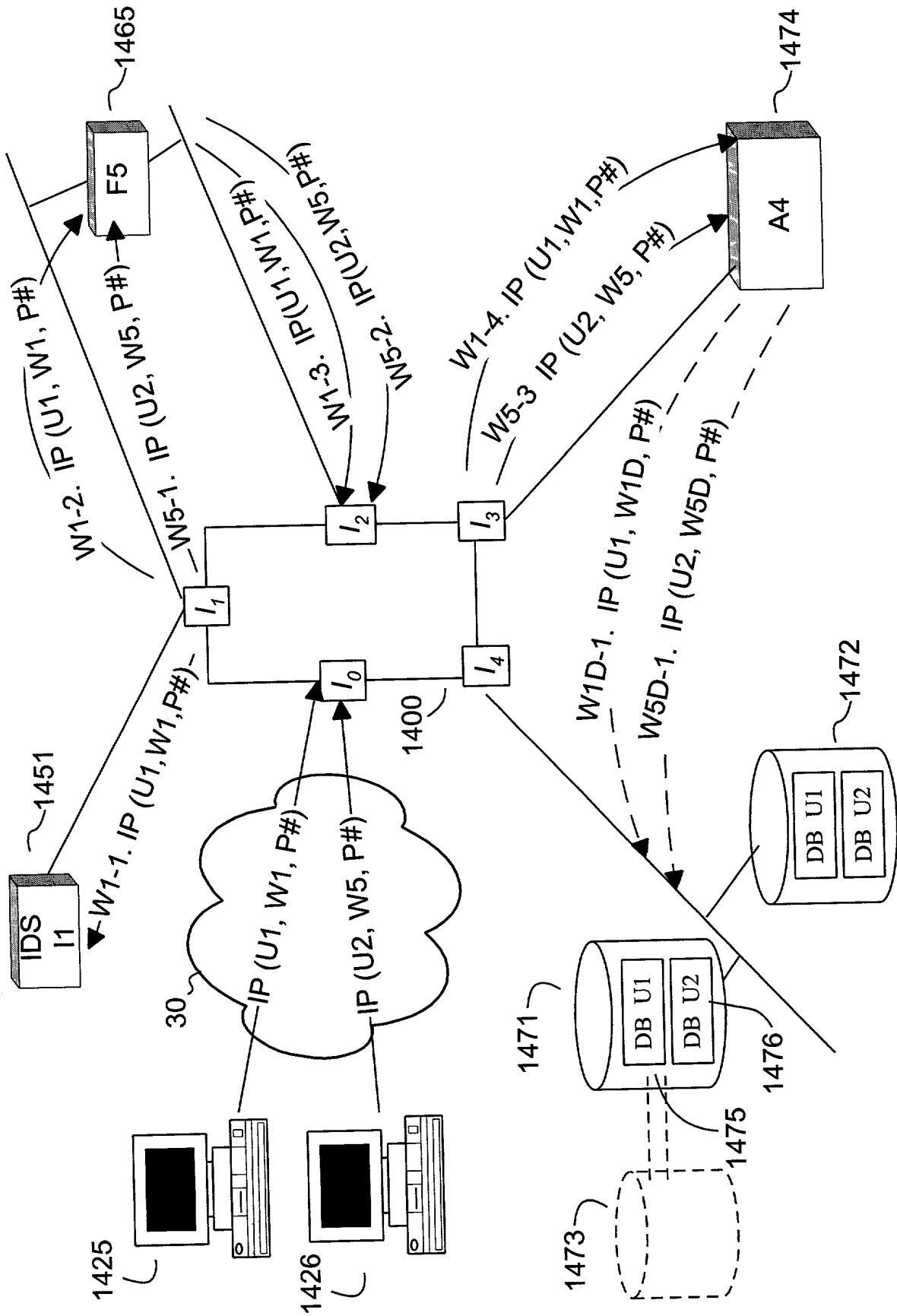


FIG. 14

SERVICE IP ADDRESS W1

STEP W1-1	INTRUSION DETECTION	I1
STEP W1-2/3	FIREWALL	F5
STEP W1-4	APPLICATION SERVER	A4

FIG. 14A

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SERVICE IP ADDRESS W5

STEP W5-1/2	FIREWALL	F5
STEP W5-3	APPLICATION SERVER	A4

FIG. 14B

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SERVICE IP ADDRESS W1D

STEP W1D-1	DATABASE SERVER	D1
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FIG. 14C

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SERVICE IP ADDRESS W5D

STEP W5D-1	DATABASE SERVER	D1
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FIG. 14D

1434



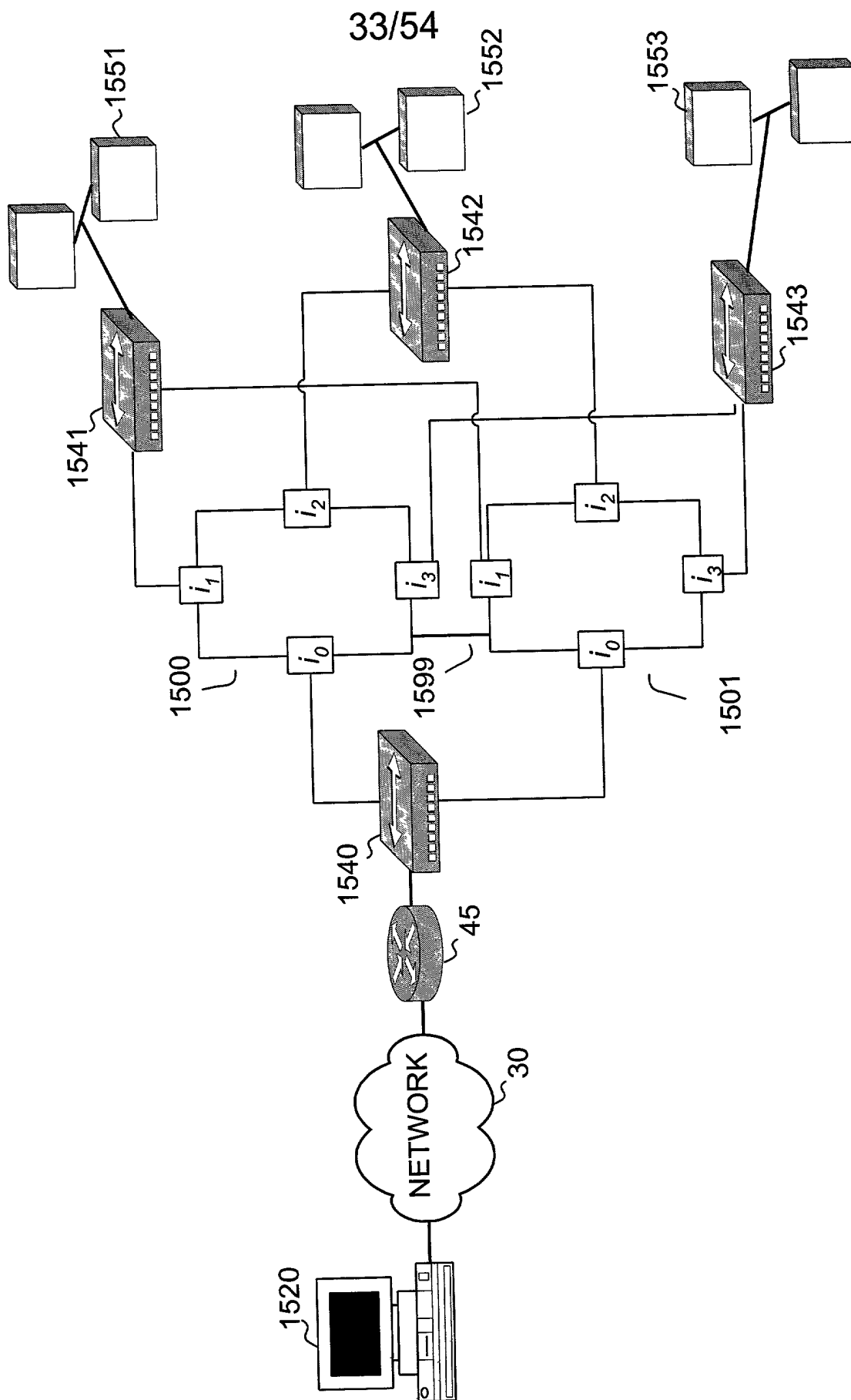


FIG. 15

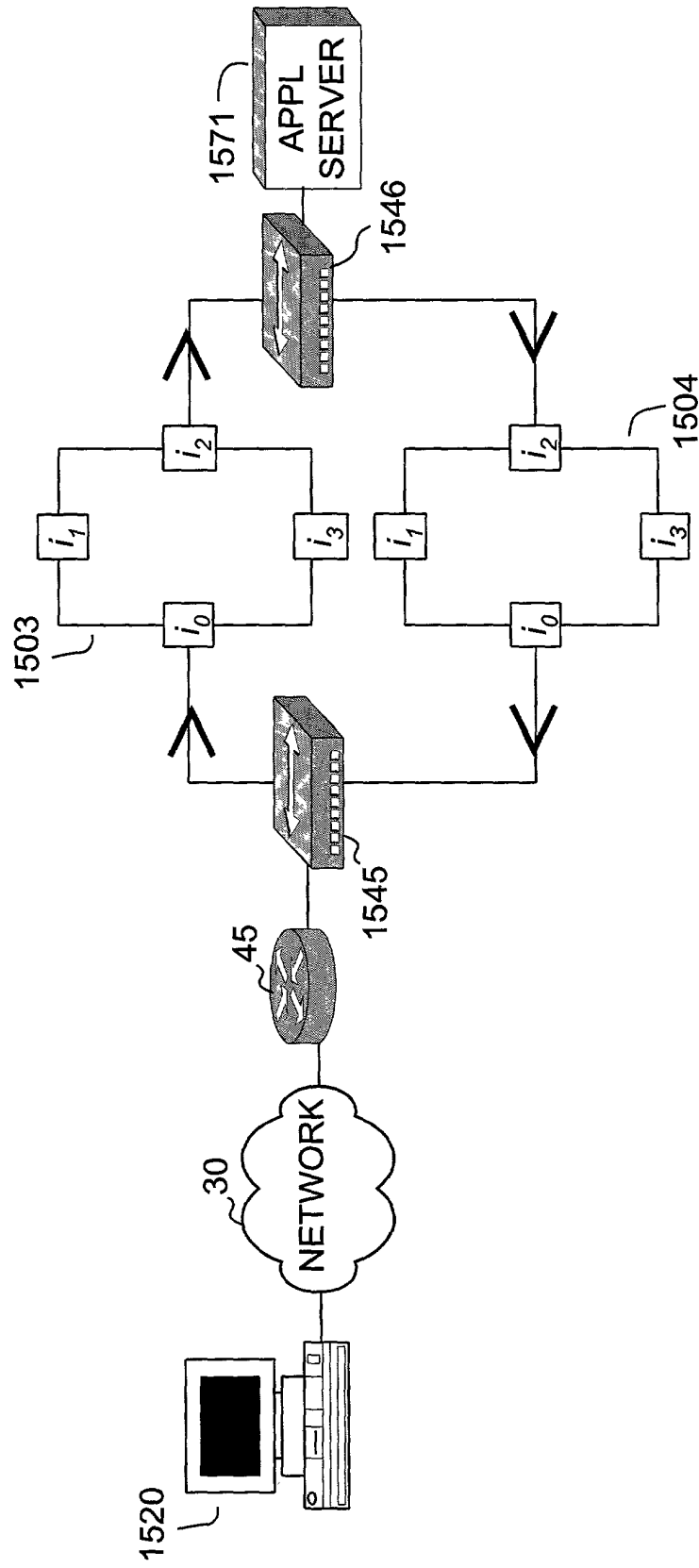


FIG. 15A

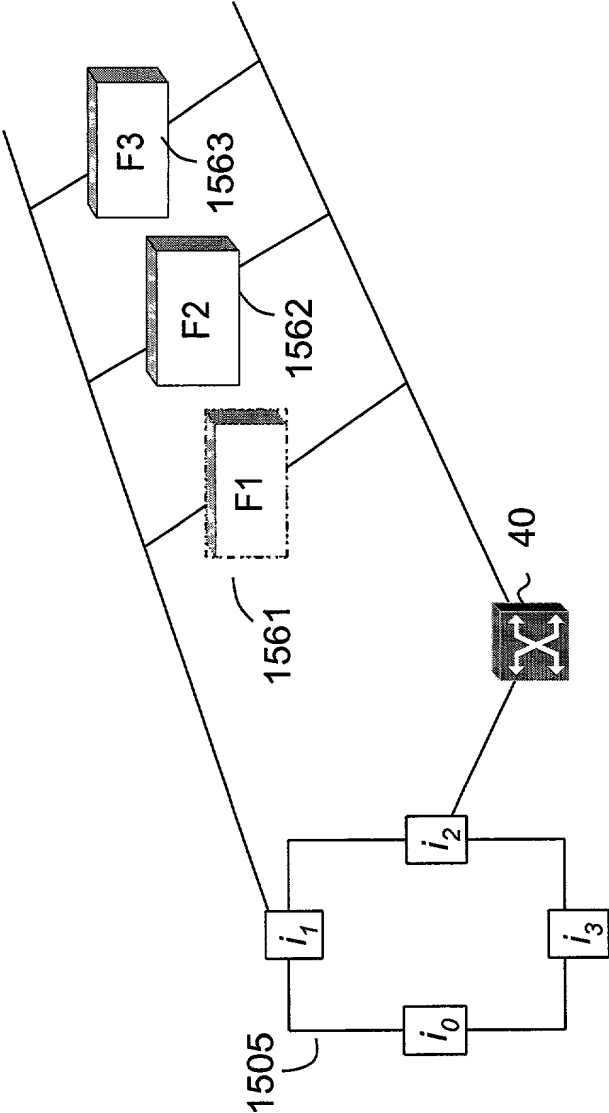


FIG. 15B

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SEND IT OUTBOUND FROM PACKETING ENGINE			
SEND FROM INTERFACE	DEST. SYSTEM TYPE	SEND PACKET TO	
		MAC	IP
$i_1$	TRANSPARENT	FIREWALL F1 <sub>M</sub>	W1
$i_1$	TRANSPARENT	FIREWALL F2 <sub>M</sub>	W1

FIG. 15C

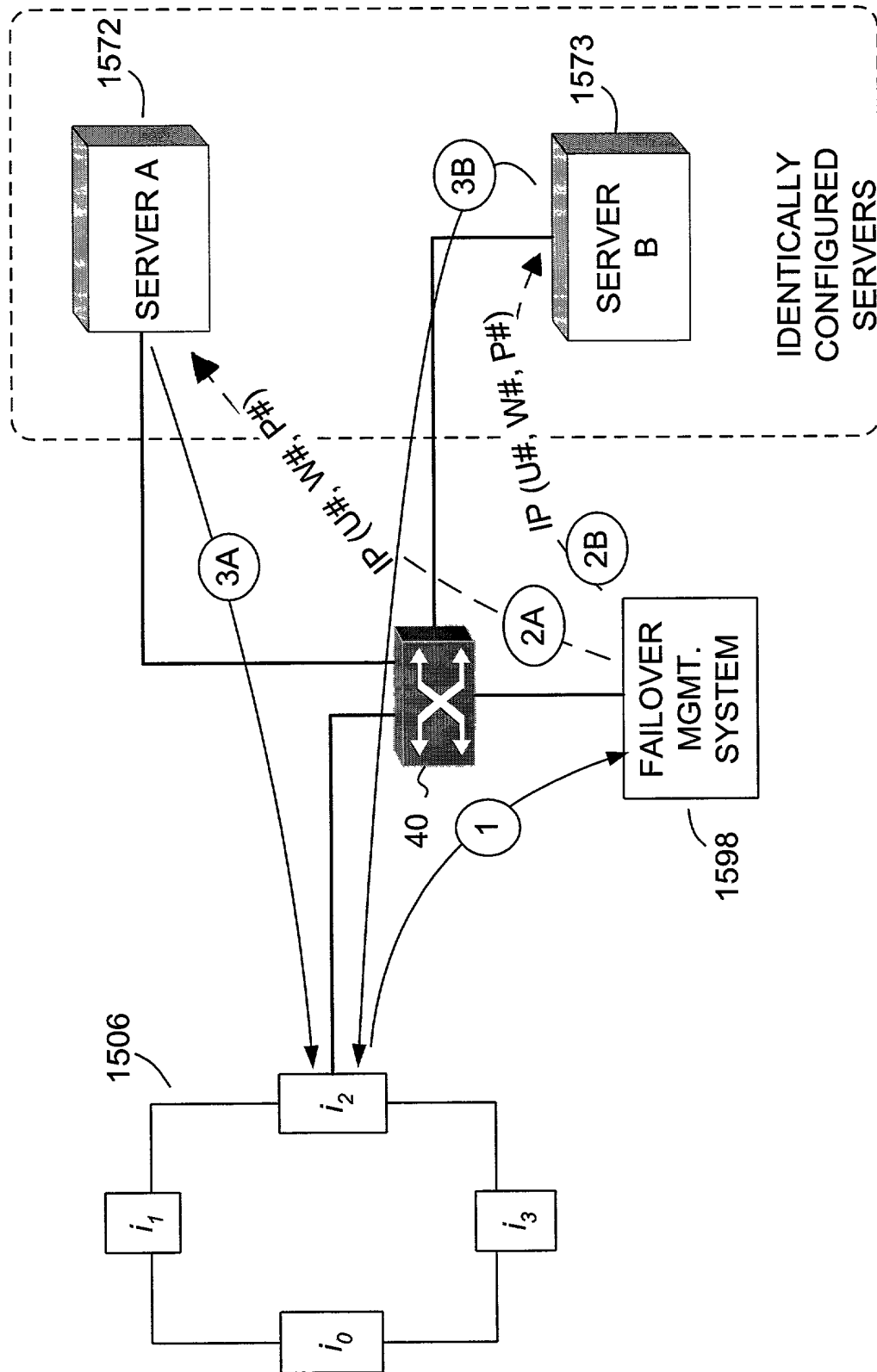


FIG. 15D

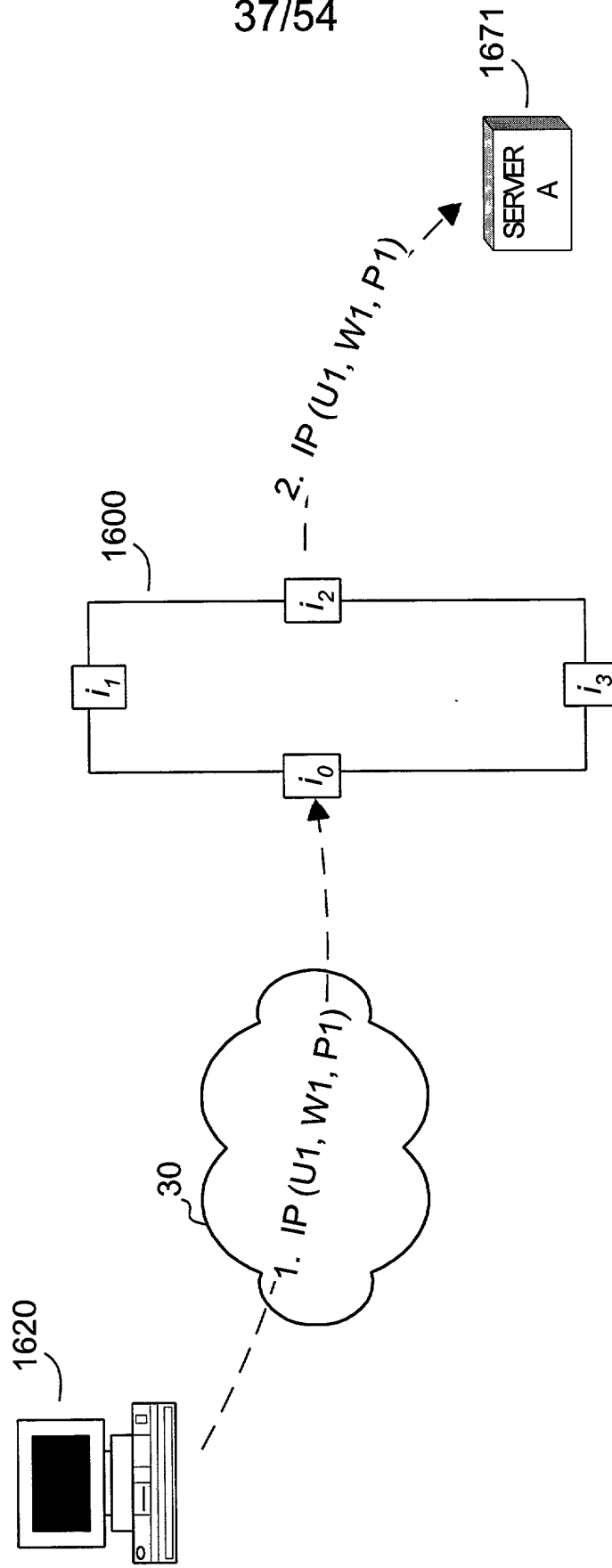


FIG. 16

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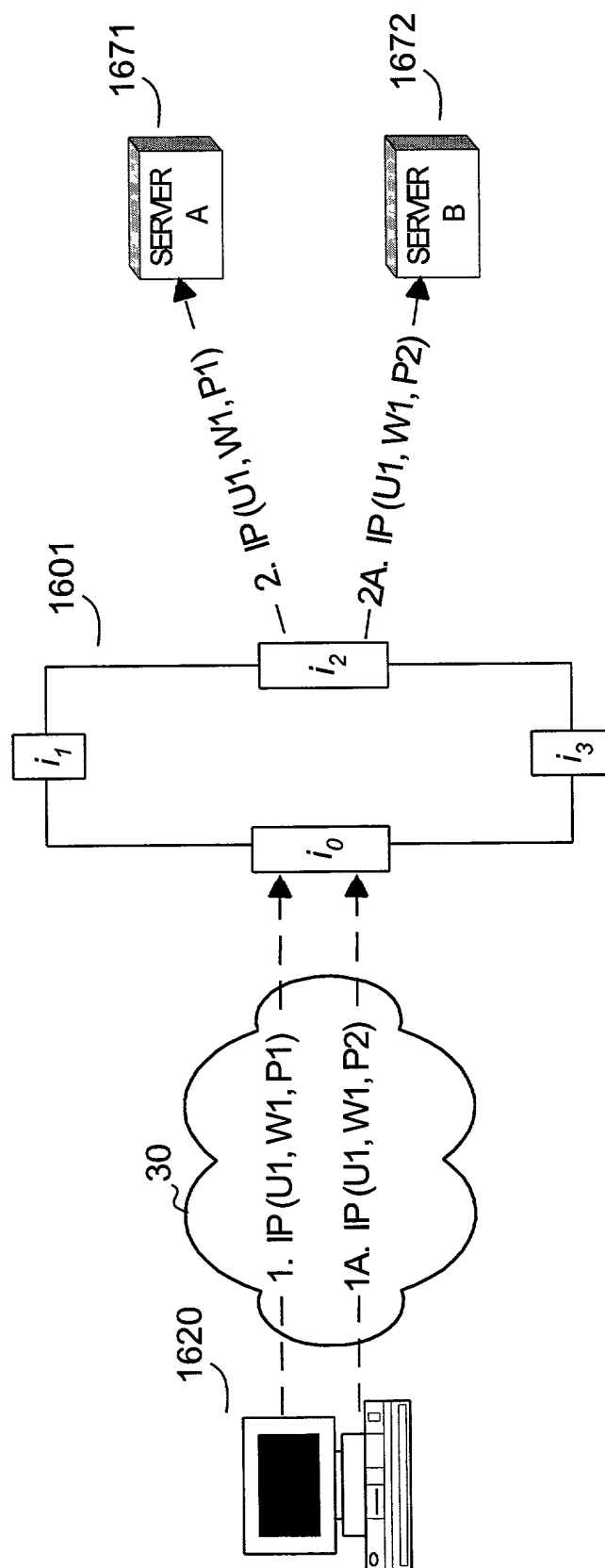


FIG. 16A

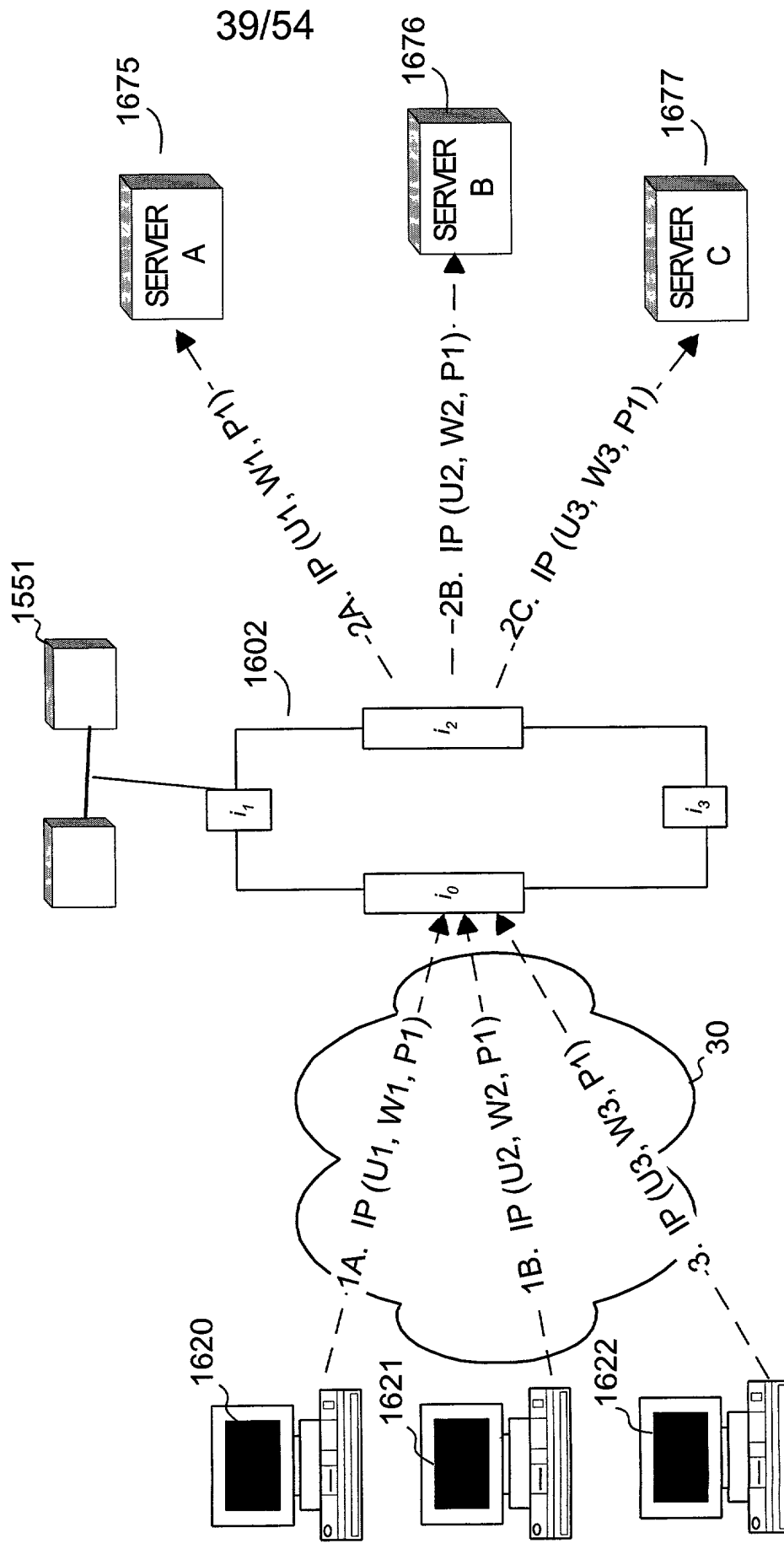


FIG. 16B

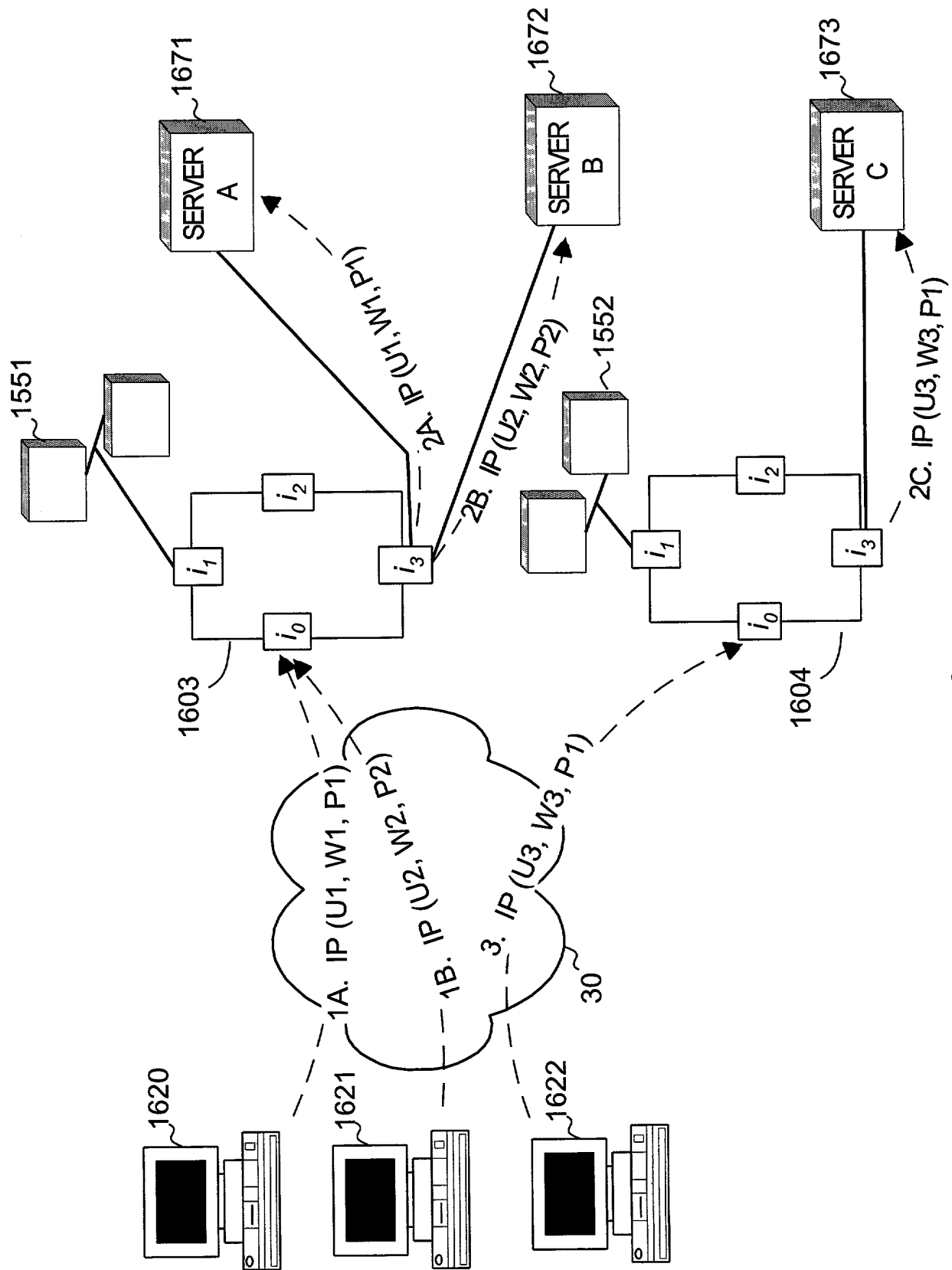
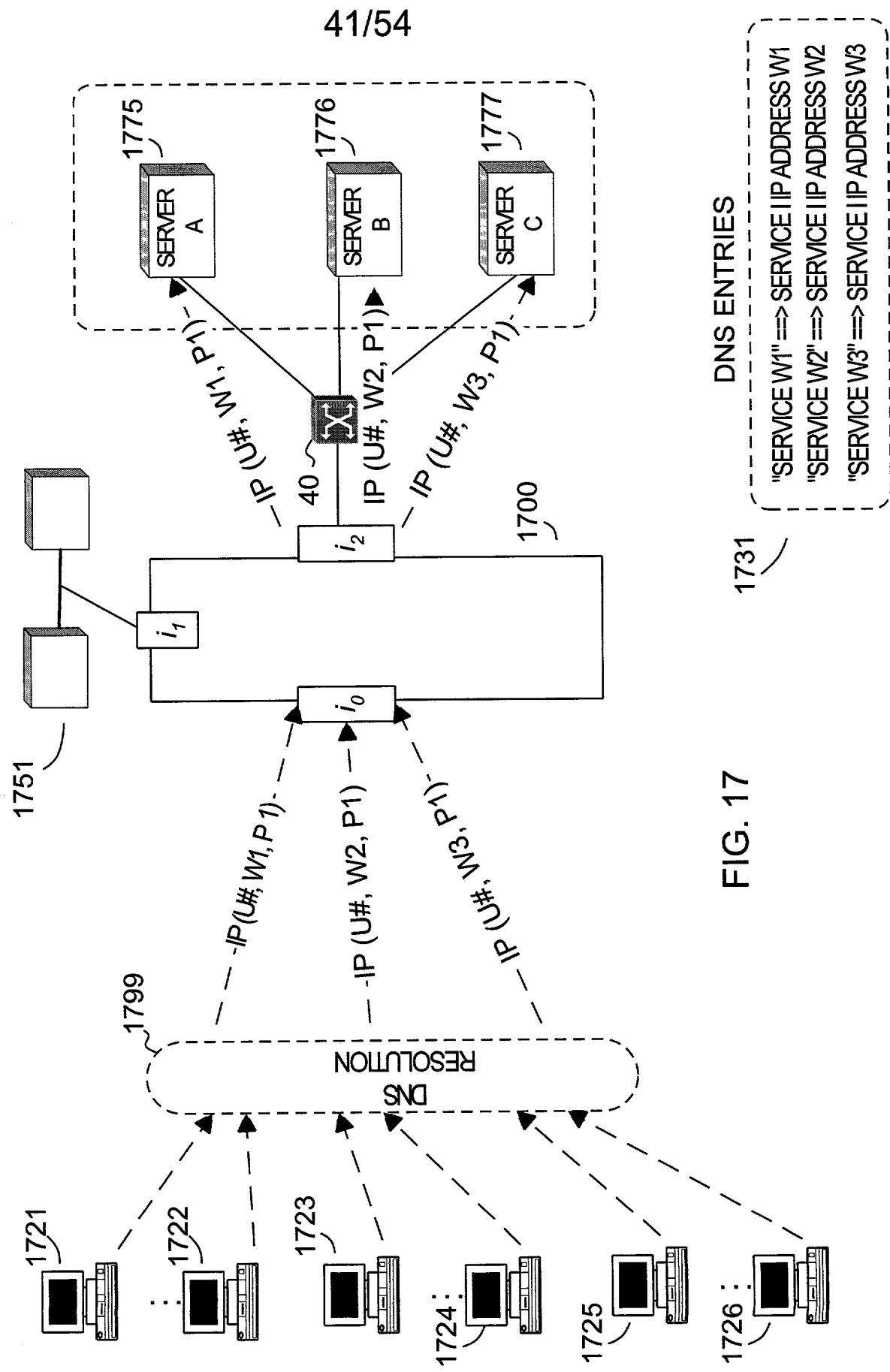


FIG. 16C





DNS ENTRIES

- "SERVICE W1" ==> SERVICE IP ADDRESS W1
- "SERVICE W2" ==> SERVICE IP ADDRESS W2
- "SERVICE W3" ==> SERVICE IP ADDRESS W3

FIG. 17

FIG. 17A

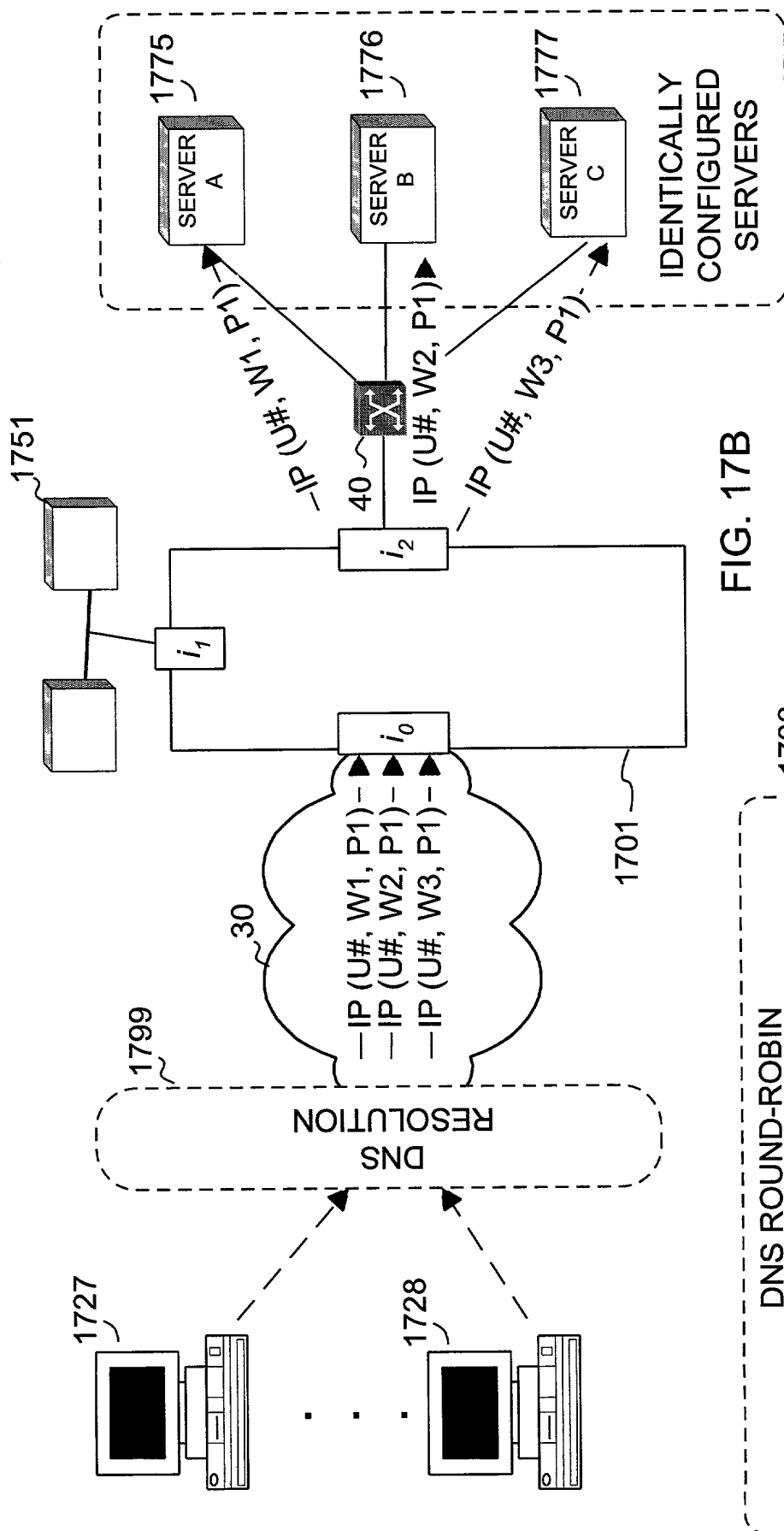


FIG. 17B

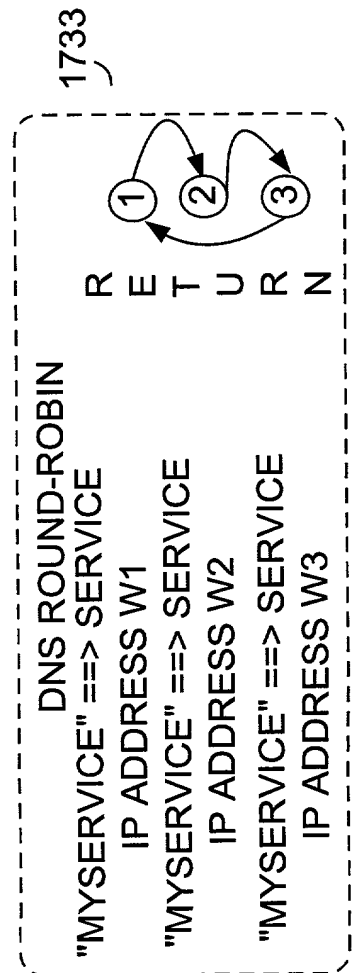


FIG. 17C

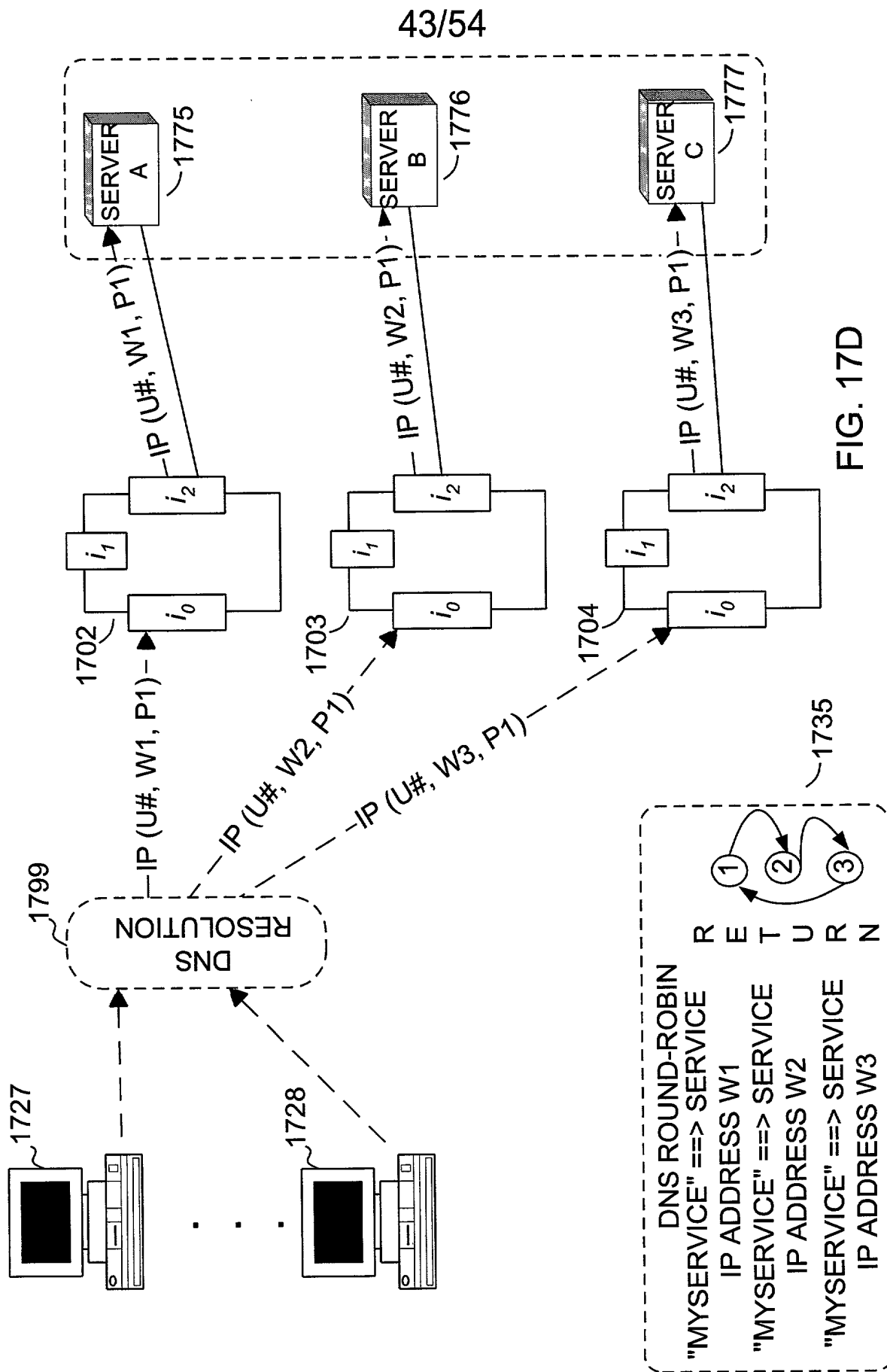


FIG. 17E

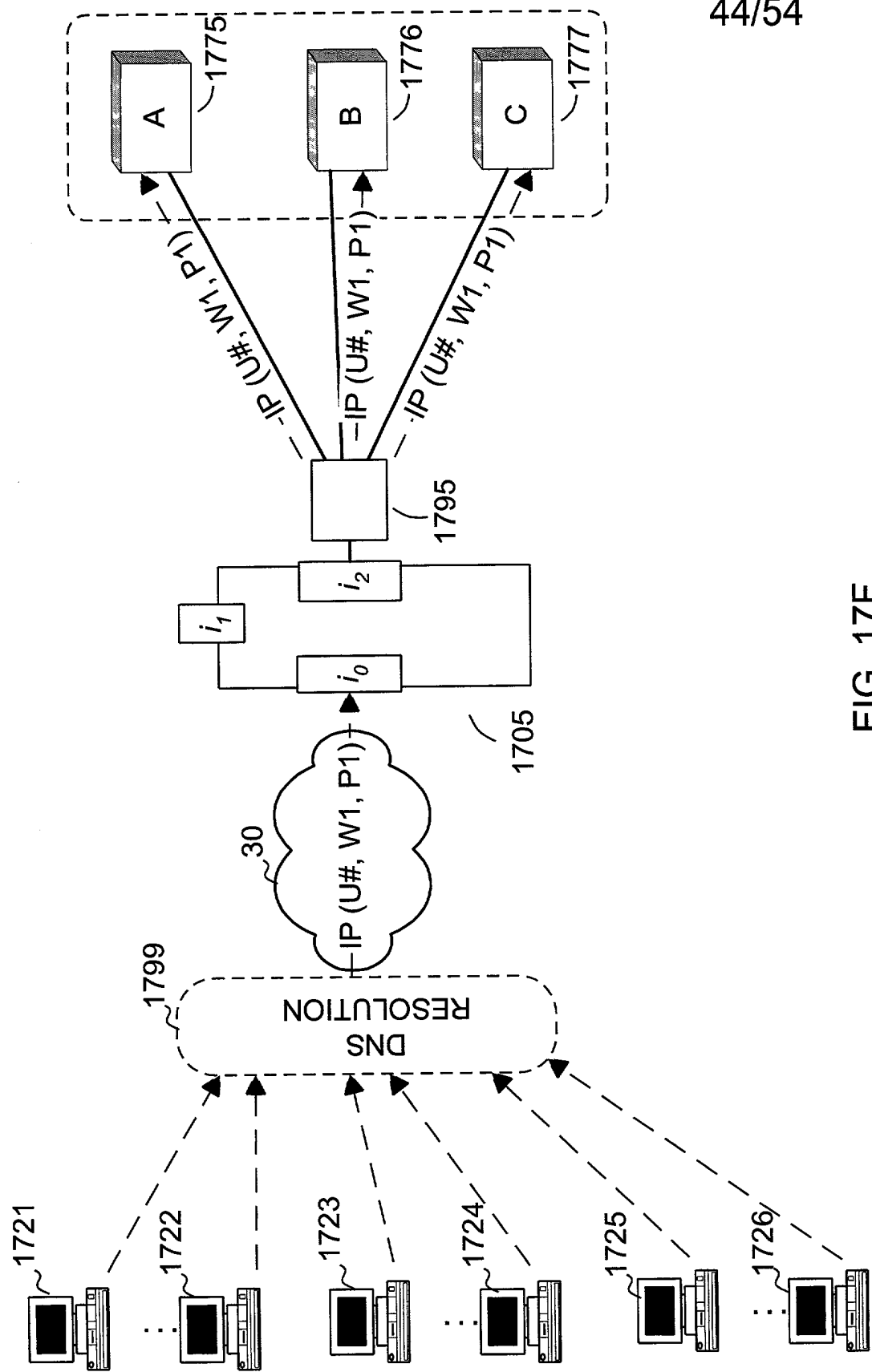


FIG. 17F

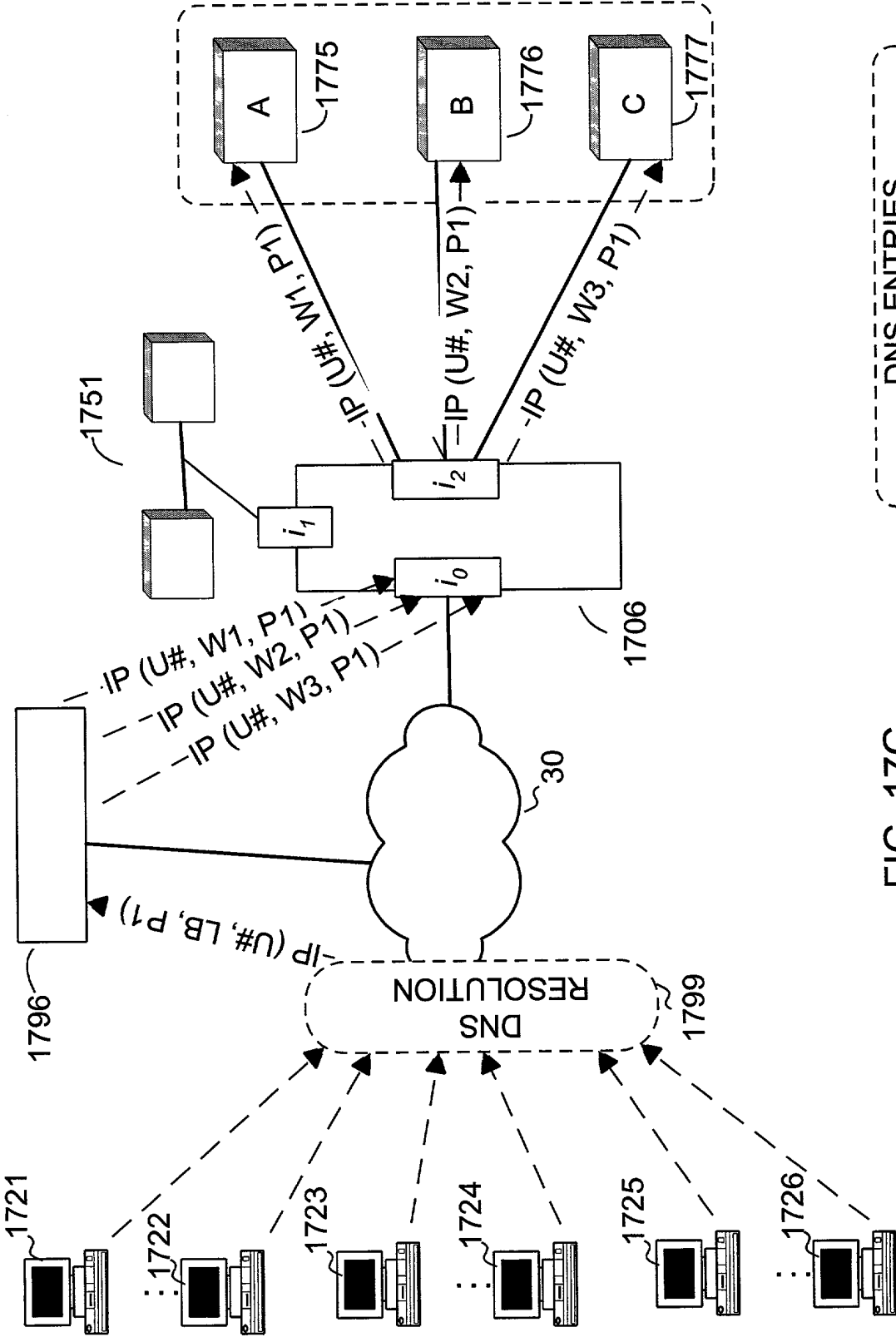


FIG. 17G

DNS ENTRIES  
"SERVICE W" ==> LB

FIG. 17H

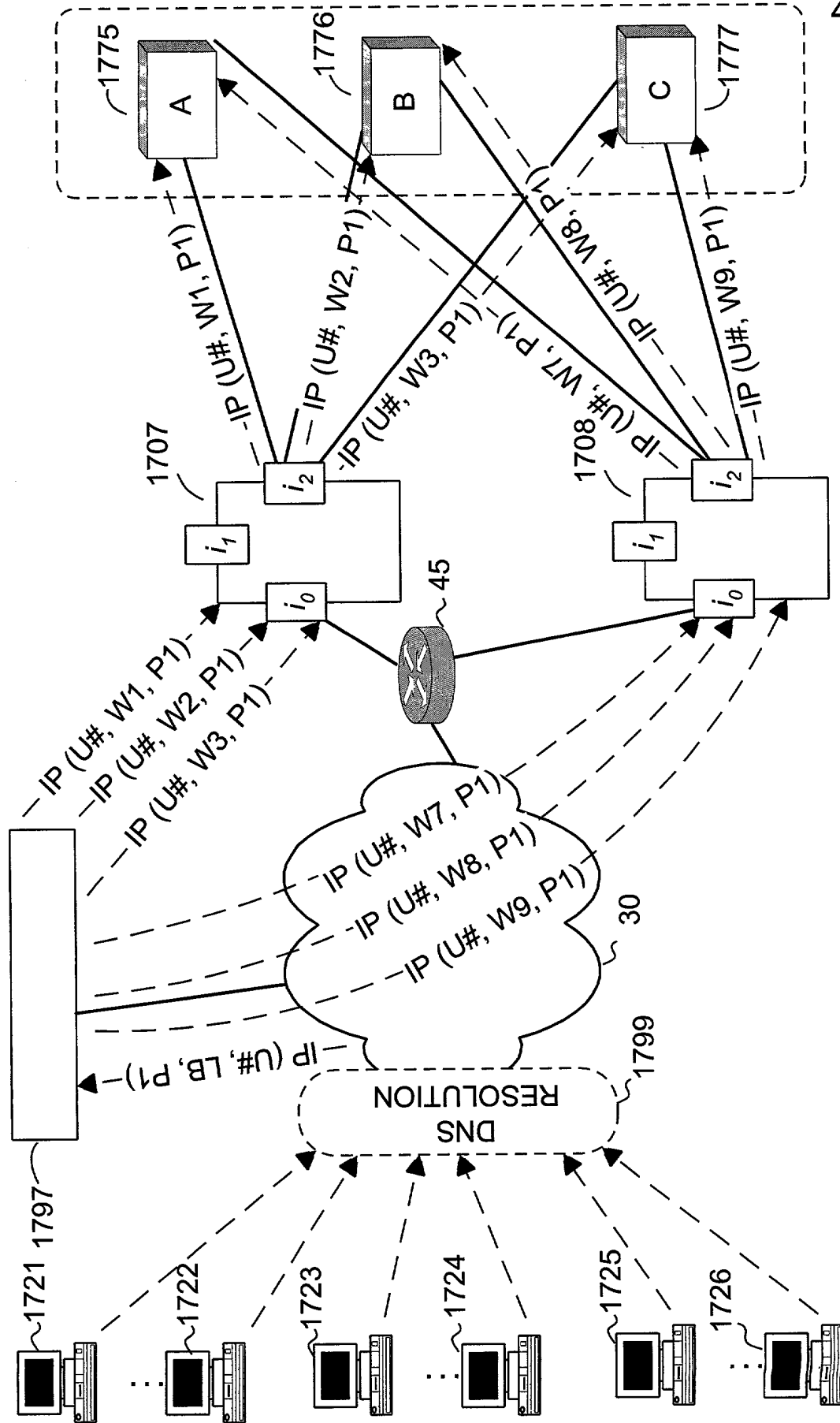


FIG. 171

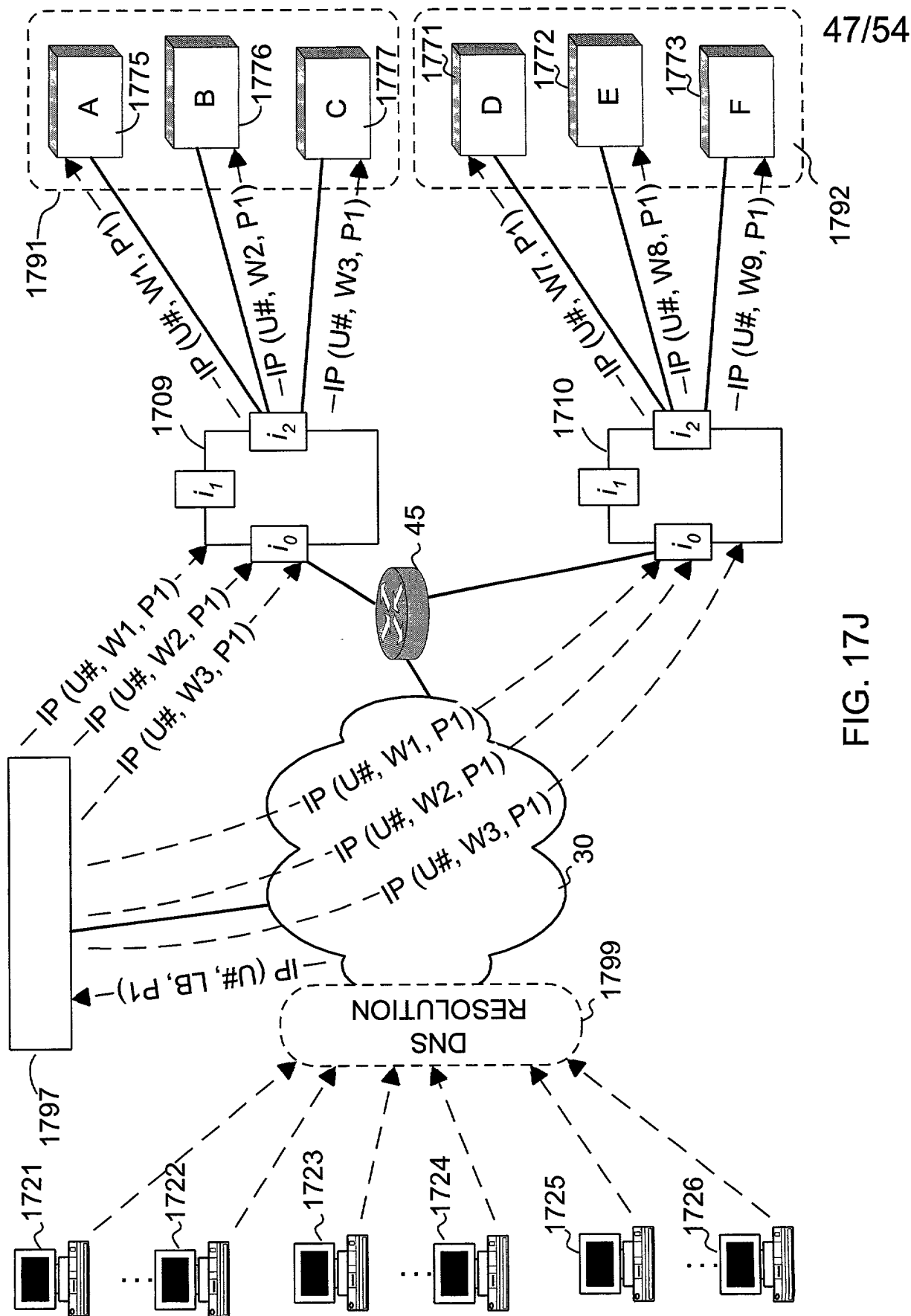


FIG. 17J

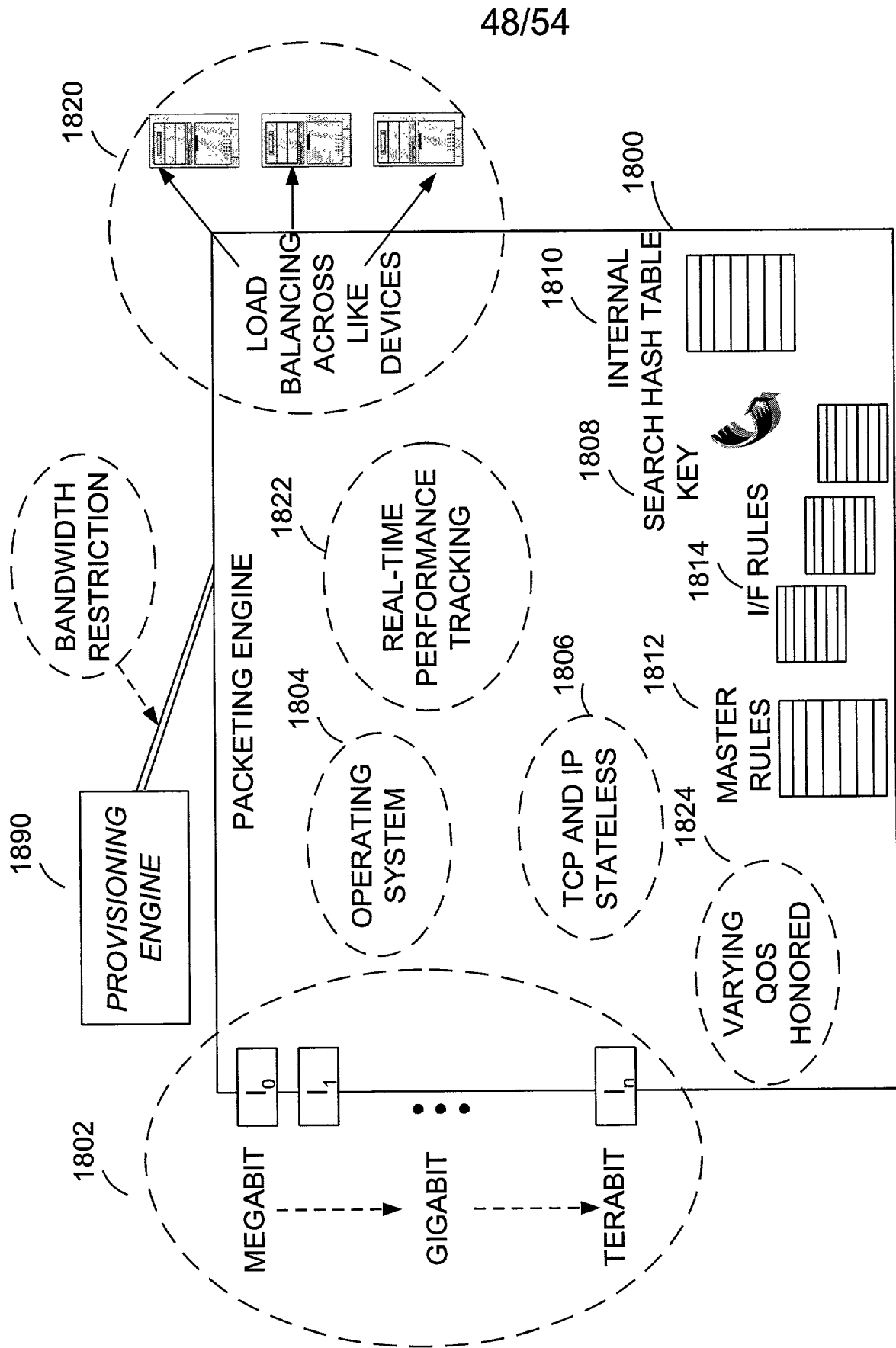


FIG. 18



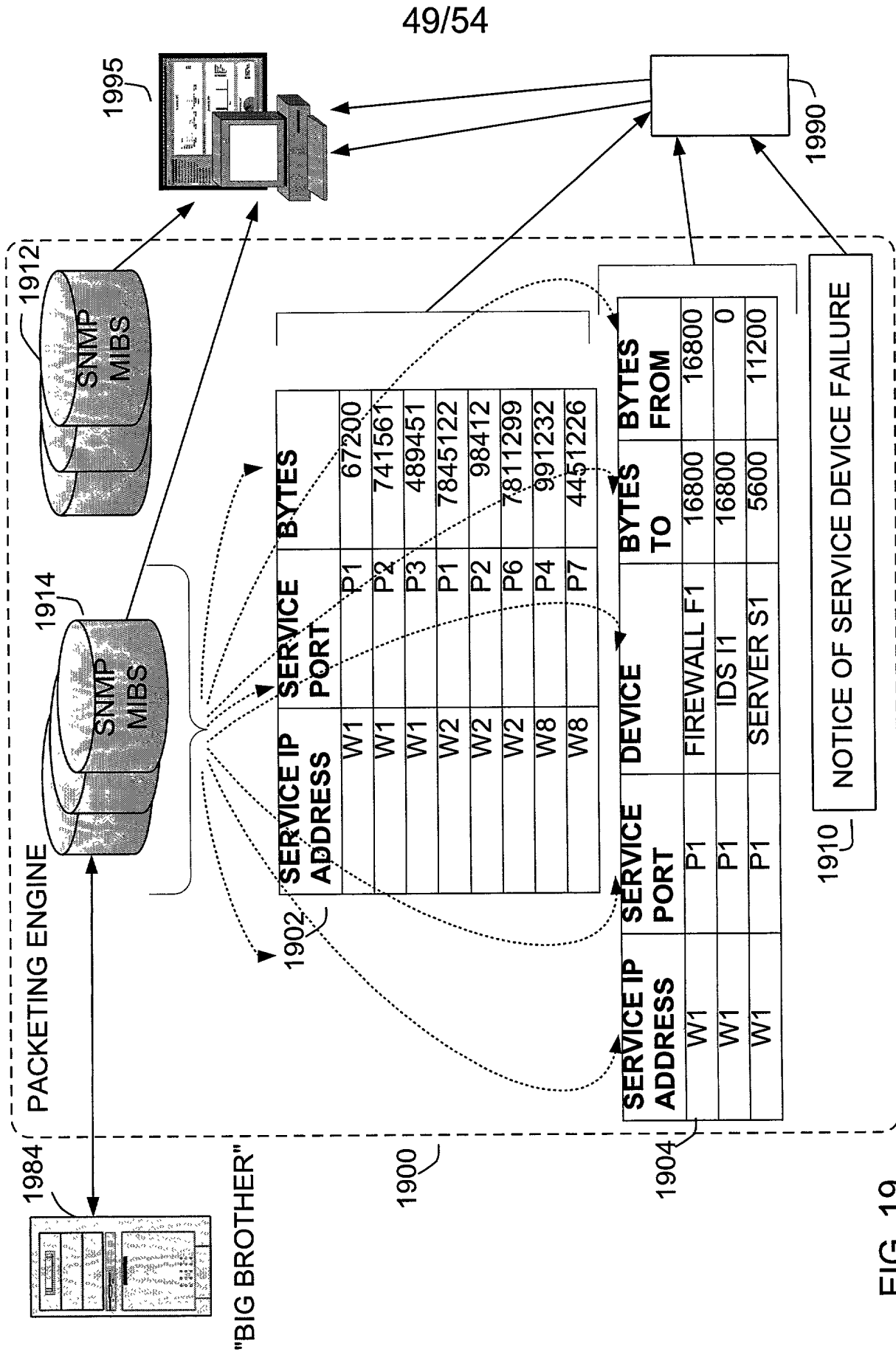


FIG. 19

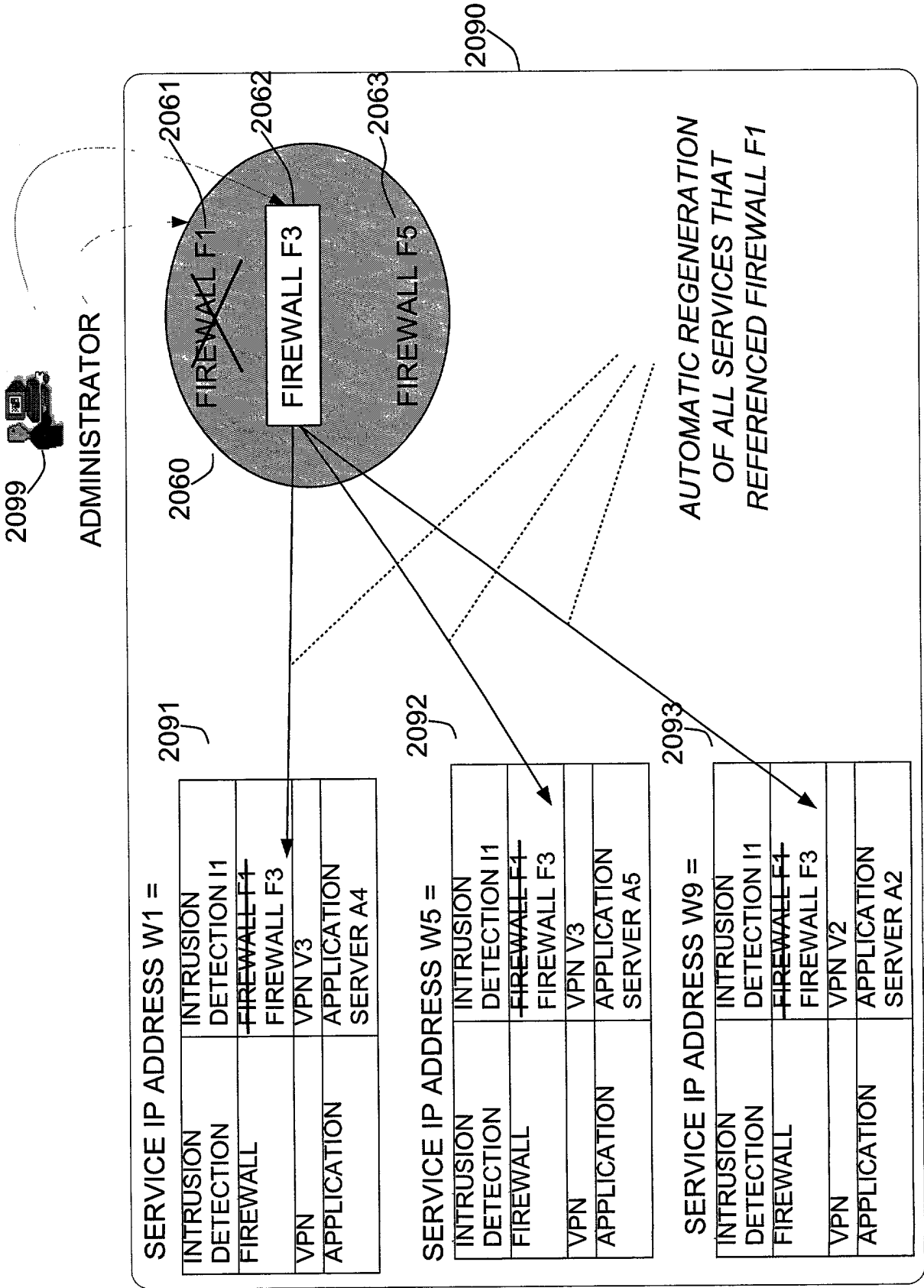


FIG. 20

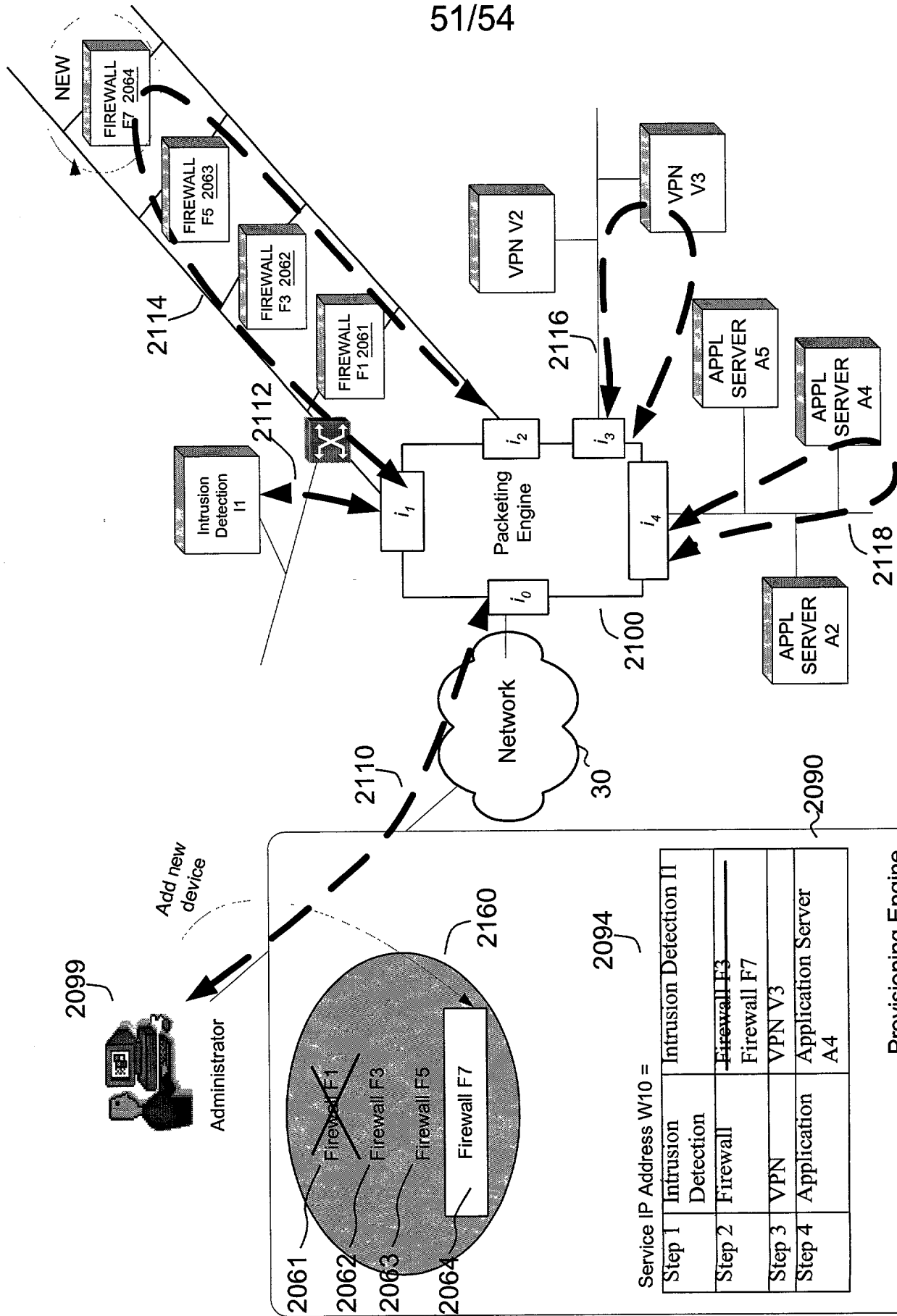


FIG. 21

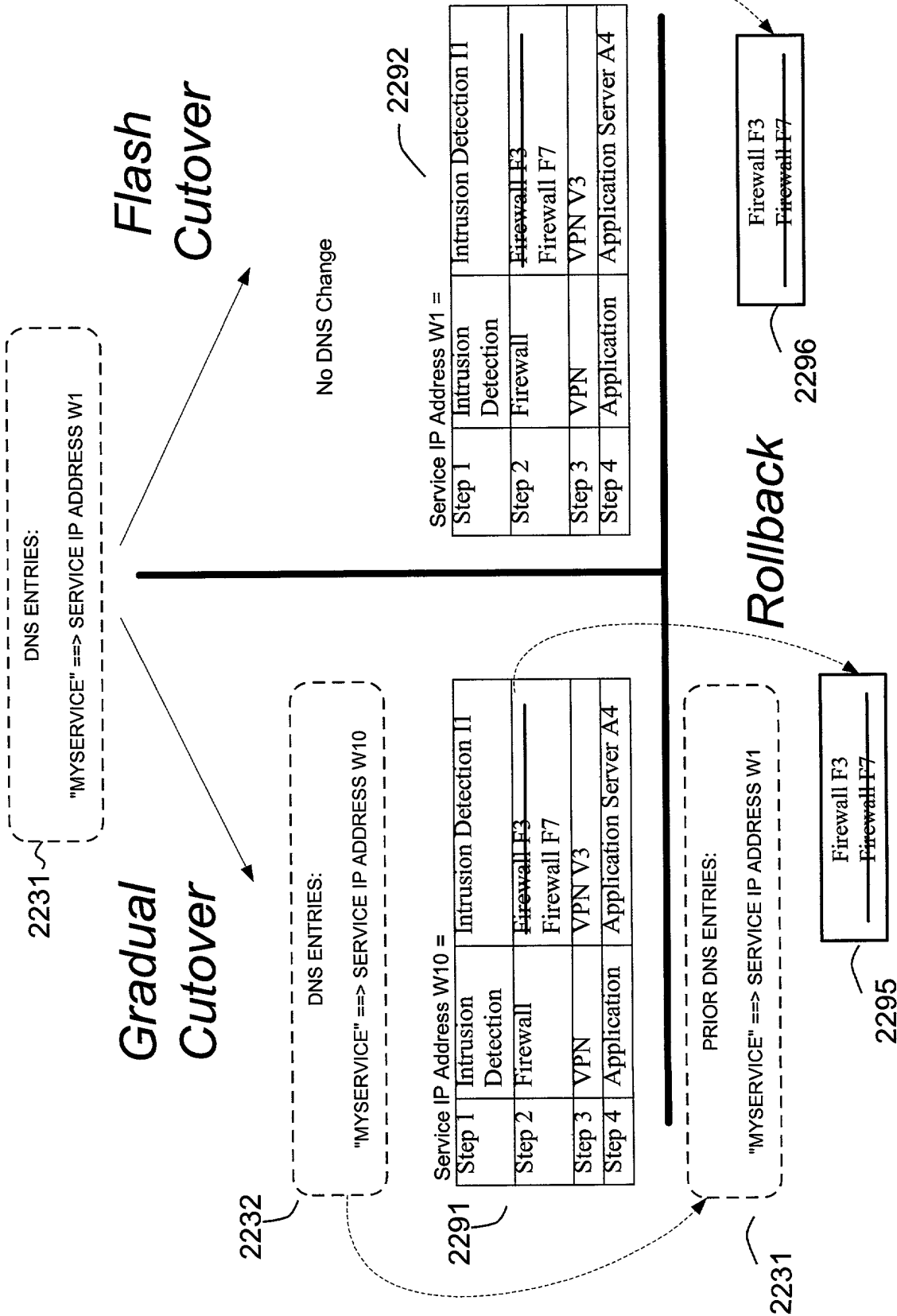


FIG. 22

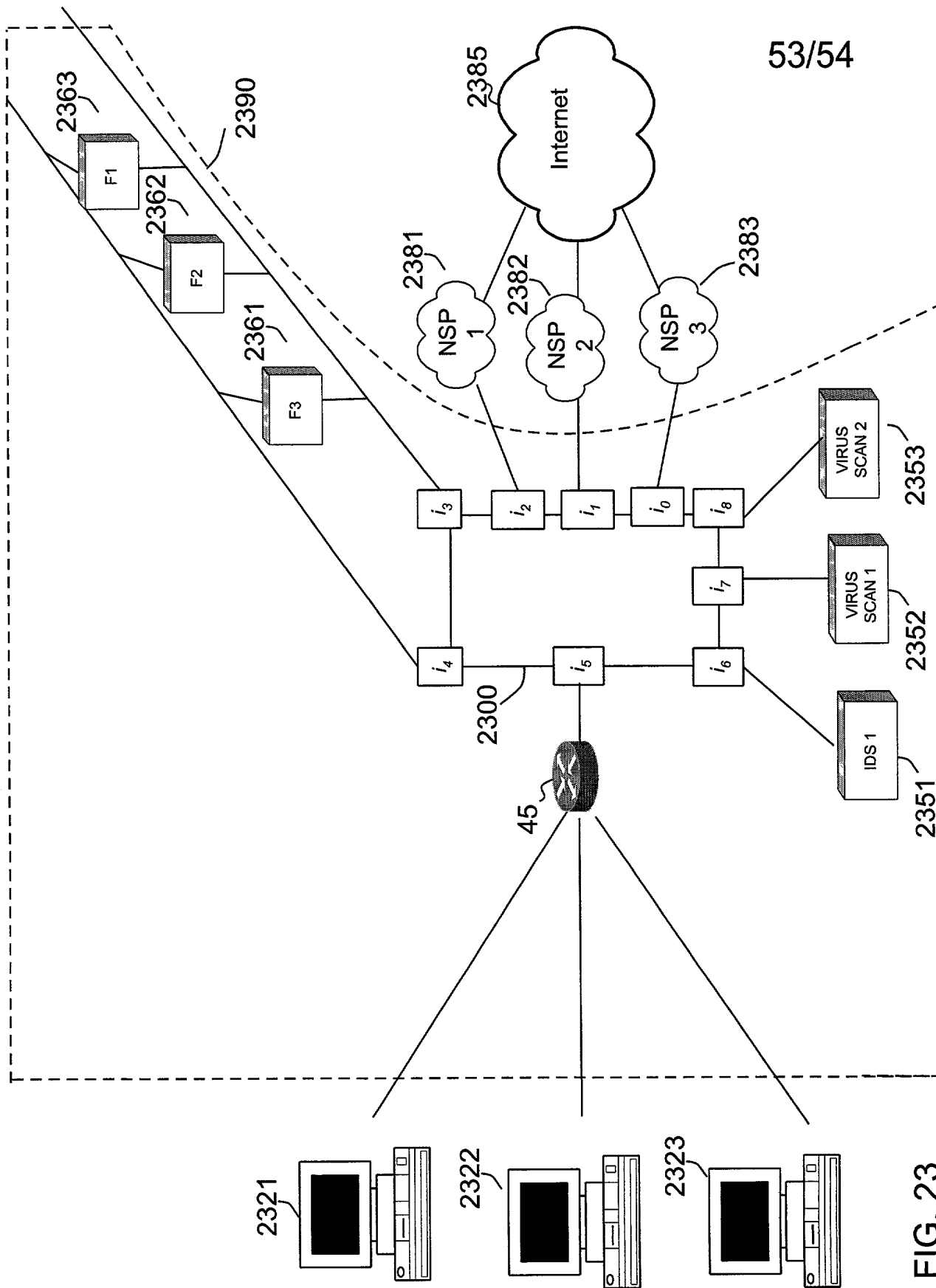


FIG. 23

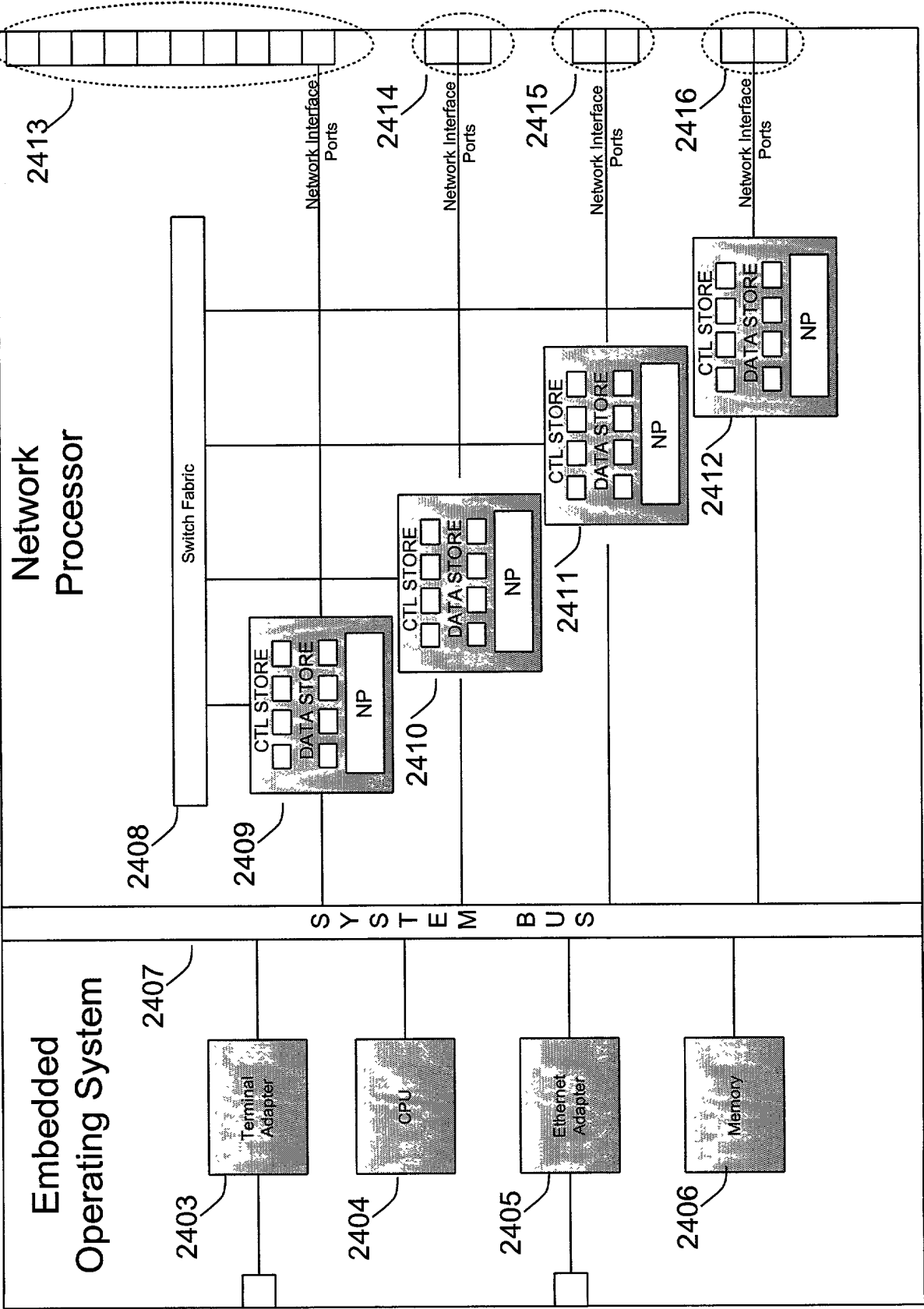


FIG. 24